The Manitoba Medical Review

Vol. 27 SEPTEMBER, 1947 No. 9

SURGERY

The Use of Antibiotics in Surgery

Michael L. Mason, M.D., F.A.C.S., Chicago*

Associate Professor of Surgery, Northwestern University Medical School; Associate Editor, Surgery, Gynecology and Obstetrics

In his approach to the control or prevention of infection the surgeon has variously stressed certain factors which are important either in the development of an infection or in keeping it going once it has become established. In the main, two approaches or philosophies obtain, one which concerns itself largely with the extermination of bacteria as the means of dealing with infection, the other with the reactions of the patient generally and locally to the presence of bacteria. Control based upon a strictly bacteriologic concept has led to the development of a wonder-horde of antiseptics aimed at destroying bacteria.

In his use of antiseptics the surgeon is confronted at the start with the necessity of choice. He must consider the type of infecting organism and must often make sensitivity tests so that he can choose the most effective agent. It is often not enough to know the species of the bacterium; there may be varying degrees of susceptibility within species.

The other philosophy of surgical infection deals with the reaction of the involved tissues, with the conditions obtaining locally and generally which favor infection, and with the mechanism by which the human organism deals with contaminating, commensal and invading bacteria. As a consequence of this approach there has resulted a clearer understanding of the causes and sources of wound infection, of the significance of invasive infection as opposed to local suppuration, of the role played by devitalized tissue, serum and blood, of the significance of foreign bodies, obstructive lesions and encapsulated foci in predisposing to or maintaining infection. The general condition of the patient, such factors as age, debility, vitamine and protein deficiency, have become more clearly understood and attention has been switched from infection per se to the larger field of wound healing.

Through common usage the term antibiotic has become restricted to those agents derived from bacteria, yeasts, moulds and similar lowly forms of plant life. They are not protoplasmic poisons like the chemical antiseptics but disturb bacterial metabolism by competing with bacteria for nutrients or enzymes, by inhibiting oxidation, upsetting metabolism and enzymatic systems and leading to cessation of bacterial growth. They are usually bacteriostatic rather than bactericidal. These substances are neither new nor rare, only their application to surgery is new. Over one hundred antibiotics have been described and tested, and new ones are being announced frequently. Their production and practical application are the result of co-ordinated study by the bacteriologist, chemist, pharmacologist and clinician. It appears that the most potent and most valuable remains the one first used clinically—Fleming's penicillin. Fortunately penicillin is innocuous or practically so and its indiscriminate and empirical use has not led to great harm. Probably because of this fact the strict indications for its use are not too well known.

The erratic behavior of penicillin during the year just past led to considerable study of the make-up of the various commercial varieties of penicillin. Two possible explanations were advanced. One was that penicillin ordinarily consists of five penicillins or five fractions, called F, G, X, K and dihydro F; fraction K which was found to be present in large amounts in certain batches of the drug was so quickly lost in the body as to be ineffectual. Large doses therefore were required to secure effective blood levels of the potent fractions. Penicillin X and G are the most potent, and most commercial penicillin today is largely penicillin G. Another explanation offered was that as the drug has become more and more purified it has lost certain qualities which may have contributed to its efficacy. The first explanation is apparently the correct one.

In general so far as surgery is concerned penicillin, with some exceptions, is effective against the same organisms as the sulfonamides, only in most instances it is more so. Penicillin is effective against most gram positive bacteria, as well as against the meningococcus, the pneumococcus, the staphylococci, most streptococci, numerous clostridia, the gonococcus, actinomyces, and the spirochete of syphilis. It does not supplant sulfonamide in meningococcal meningitis nor in preparation of the bowel for surgery.

We can consider penicillin in surgery from the standpoint of its prophylactic and therapeutic uses in the care of open wounds and from the standpoint of its administration in surgical infections.

In the care of open wounds the use of anti-

*Presented before the Sectional meeting of the American College of Surgeons on April 28, 1947, at Winnipeg

biotics has not altered the fundamental principles of surgical therapy, but rather has emphasized their importance. In the management of wounds during the recent war the steps essential to care were early and prompt surgery, removal of devitalized tissue and foreign bodies, control of hemorrhage, provision for adequate drainage, pressure dressing and splinting until such a time as closure was possible—usually 4 to 10 days later. The administration of sulfonamides and later on in the war of penicillin (following usually both initial and secondary surgery) was shown to protect against certain types of invasive infection, in properly treated wounds. However, no amount of chemotherapy or antibiotics will compensate for inadequate initial care, failure to protect wounds from secondary contaminants, failure to immobilize the part, or for neglect of those resuscitative measures found to be so brilliantly successful. All life is a struggle for food. Only a few of the bacteria with which the surgeon has to contend in open wounds or elsewhere are primarily invasive—the majority have to be spoonfed on blood clots, devitalized tissue and serum, or thrive back of obstructive barriers or in scar tissue dugouts. Dead and contaminated tissue will undergo decomposition regardless of the amount of penicillin either locally or systemically administered. Control series of observations have not been furnished from the theatres of operation; however, with all other things being equal the results of wound care were found to improve as the experience of the surgeons increased. This meant not that the surgeons were giving or applying chemotherapeutic drugs better but they were learning to debride wounds better, their judgment was improving and their technical skill was increasing.

The significance of general principles may not be so apparent in surgical infections not associated with open wounds, or with the prophylactic use of antibiotics in general surgery, but they are there just the same and failure to recognize and observe them will be just as disappointing. The use of antibiotics will not compensate for careless technique or disregard of surgical principles.

Penicillin may be used to advantage in about 60 per cent of established surgical infections. These include largely the staphylococcal and hemolytic streptococcal infections, particularly if these are in pure culture. Such processes as the common furuncle and carbuncle may resolve with little or no necrosis if the drug is given early. The spread of a carbuncle is usually limited and surgery may be avoided or is considerably less extensive. Penicillin is of great value in carbuncles in the diabetic, the large early ones may disappear or are reduced to small painless fluctuant areas requiring minimal incision. The mortality, morbidity and length of hospital stay have been materially reduced by penicillin. In treating recurrent furunculosis it has been my observation that while the use of penicillin will stop the development of the infections as long as the drug is used, they may recur as soon as it is stopped.

The management of acute osteomyelitis has been altered radically by the use of penicillin. Altemeier, of the University of Cincinnati, has shown that with early recognition and prompt administration of penicillin a favorable outcome can be anticipated in the majority of cases. Blood cultures become sterile within 24 to 72 hours. The diagnosis must be made entirely on clinical signs and symptoms without waiting for x-ray confirmation. Treatment consists of the intramuscular injection of penicillin in adequate doses over a period of two to three weeks, with a total dosage of at least 1½ million units, but this may total as high as 8 or 9 million units. Attention must be paid to fluid, saline and protein balance. The extremity should be splinted for several weeks and frequent x-ray checks should be made. Surgical intervention is usually limited to drainage of abscesses, should they appear, occasionally to the removal of sequestra. In the fulminant case seen late, early drainage may be required before penicillin has been administered in adequate dosage but this is the rare exception. If diagnosis is made within 24 to 72 hours, bone changes will be minimal and restoration of the bone to normal may be expected within 5 to 6 months. Even minimal abscess may be avoided. If diagnosis is not made until several days have elapsed, various visceral complications may develop and bone destruction may go on to extensive sequestration. Many sequesters even in late cases may become revascularized by a process of creeping substitution like a bone graft, or may be absorbed after restoration has occurred. In the series of 64 cases reported by Altemeier there was but one death.

Similar favorable results have been reported in treatment of acute postoperative infection, involving bones and joints, and with chronic bone and joint infections. In some cases it is occasionally possible, under penicillin protection, to carry out required operative procedures without dissemination of the infection, although it would seem wiser to me to bring the infection under control first and to carry out reparative surgery later.

In staphylococcal septicemia the mortality has been reduced from an average of between 70 and 80 per cent to 30 per cent. Deaths in patients with staphylococcal septicemia under treatment with penicillin are due to complications such as endocarditis, sinus thrombosis, pneumonia and are more likely to occur in older patients or in those

in whom the treatment is started very late. In the septicemic cases it is necessary to give large doses from the start, to keep up treatment for some time after the blood culture has become negative, and to be on the lookout for and remedy any foci amenable to surgery.

In the management of gas gangrene penicillin has a place but it is distinctly subordinate to surgery. Most important in this condition is the initial surgery which by removing devitalized tissue removes the pabulum on which the organisms thrive. Once the infection develops surgery is again necessary and consists of drainage and excision, or amputation. There is evidence to support the view that the use of penicillin has enabled the surgeon to be more conservative in his choice between excision and amputation in patients with clostridial myositis. Some experimental work on guinea pigs recently reported by Altemeier shows that in gas gangrene huge doses of penicillin will hold the infection in check but will not eradicate it. Equivalent doses in man would be somewhat in the order of 1,000,000 Oxford units every three hours. There still remains the need for local surgical excision of the focus and devitalized tissues.

Actinomycosis has responded to the use of penicillin, although reports are somewhat in conflict as to its degree of efficiency. Some surgeons have reported very spectacular results with the use of penicillin alone, while others feel that it should be combined with the sulfonamides. As pointed out recently by Gage and Lyons the blood and protein depletion in these patients must be corrected.

In the management of neglected cases of appendicitis and of appendiceal peritonitis penicillin is a valuable aid if given in very large doses. The organisms involved in the process are mixed, and many of them, particularly the colon bacillus, produce penicillinase which inactivates penicillin. Enough penicillin should be given to satisfy the penicillinase and still leave some over to combat the other wound pathogens, especially the gram positive cocci which are the worst offenders. Crile and Fulton advise a dosage of 100,000 units every two hours for the first two days; 50,000 units every two hours for the next two days; 50,000 units every four hours for the next two days; and 25,000 units every four hours for two days. The dosage and periods of time over which the drug is given are varied according to the response. The drug is not proposed as a treatment for appendicitis to replace surgery. There still remains the need for appendectomy and the drainage of abscesses. It has long been shown that if the focus, the appendix, is removed the peritoneum can usually take care of soiling if no further soiling is added. In the case seen late in the course of the disease in which peritonitis is already present and in which there seems to be some evidence in favor of the Ochsner treatment there is no doubt that antibiotic therapy is indicated. Following appendectomy in which local or diffuse soiling is found and in which the abdominal wall is contaminated, the surgeon certainly welcomes this adjunct. In view of the presence of gram negative bacilli which do not respond to penicillin there is some logical basis for the combined use of streptomycin and penicillin.

Meleney's progressive synergistic gangrene of the skin is due to a microaerophilic nonhemolytic streptococcus associated with a hemolytic staphylococcus aureus. The disease progresses inexorably despite all types of local application. Simple excision alone is not enough; the process starts right up again at the border. The only cure, as established by Meleney, has been the combination of wide excision of all the diseased tissues plus the application of zinc peroxide; a long and tedious process requiring great patience and courage. The sulfonamides have not been effective in halting the steady advance of the margin of the ulcer. Meleney has shown recently that penicillin in some cases may obviate the need for excision.

In the treatment of tetanus penicillin has not proved helpful, despite the fact that the organism is susceptible to the agent in vitro. Various aerobic hemolytic streptococcal infections, e.g., septicemia, cellulitis, osteomyelitis, empyema respond in a high percentage of instances providing other indications are met. Septic abortion seems to be especially favorably influenced. Anerobic streptocceal infections may also respond well as do many pneumococcal processes, although in this latter the sulfonamides are the agent of choice.

In surgery of the hand penicillin finds three particular fields of application. In hand infections, particularly those in which the process is invading the surrounding tissues or the lymphatics, penicillin is administered when the patient is first seen. In those patients with very minor conditions not requiring hospitalization the drug may be given in beeswax and peanut oil, the finger dressed and splinted and the patient seen next day. We prefer the intramuscular route for patients placed in the hospital for their infections. Lymphangitis usually subsides within 24 to 48 hours and even local suppuration is often prevented. In human bites the results are very good if the patient can be seen early, but if treatment is started late and there is already tissue destruction present drainage is required and the process is much prolonged. Where cases of infection are seen late, the local suppurative process usually requires drainage but the invasive character is

changed. In acute injuries penicillin is not always given, by any means; however, if there is a good possibility that invasive contaminants are present penicillin may be given after the wound has been treated surgically. Also in the secondary care of wounds of the hand which have a history of disturbed healing or in which the appearance at operation suggests that infection had been present penicillin is used. As for results of this regime I can say this—that if postoperative complications occur we can usually trace them to faults in surgical technic or to misjudgment as to the viability of tissues and not to infection per se. The statement so frequently made, that now with penicillin we no longer have hand infections of serious nature, cannot be accepted as stated. We cannot give the credit for the lowered incidence of hand infections to penicillin, but rather we should give credit to the better initial care wounds of the hands receive from the surgeon today in contrast to that given 10 or 15 years ago. Hand infections still occur and when they do they can usually be traced to errors or neglect.

Failure of penicillin to affect the course of an infection may be due to any one of a number of factors. Most important, of course, is the presence of bacteria not responsive to the drug. It must be remembered that not all staphylococci are responsive, nor are all streptococci. Some respond only to concentrations not obtainable in the blood stream. Actual laboratory tests are of great value in establishing the degree of sensitivity of an organism. Often there is present a mixed culture which contains bacteria such as E. coli, B. Proteus, Pseudomonas pyocyanea, and so forth, which produce penicillinase which inactivates penicillin. Here it may be possible to adminster a sufficiently large amount of penicillin to neutralize the penicillinase and still leave enough drug over to act upon sensitive organisms. Other conditions may be present, e.g., diabetes, general debility, avitaminosis, hypoproteinemia, and so forth, which must be combatted as well. The drug must be given in sufficiently large dose to inactivate the bacteria at the start, since there is evidence to show that too small doses may lead to the development of a tolerance on the part of the bacteria. The tendency today is towards the use of larger doses and it seems logical to give large amounts at the start while awaiting the outcome of sensitivity tests. Certainly if no response is forthcoming when the organism at fault is known to be sensitive the surgeon should rapidly increase the dose. It is my practice to double or treble the amount.

The preferred route of administration of penicillin is intramuscular in three-hourly doses of 20,000 to 50,000 units, although it may be advantageous to give an initial injection intravenously and follow this with intramuscular injections for subsequent doses. The subcutaneous route seems inferior to the intramuscular, not only in reaching effective blood levels but also in maintaining these levels within certain limits. The higher the dose the longer the effective level is maintained. Ordinarily a three-hour interval between injections is practical; however, in some situations where a very high level is needed a two-hour schedule is advisable. Calcium penicillin in beeswax and peanut oil, 300,000 units given intramuscularly, as developed by Romanski, will produce an efficacious blood concentration. If higher blood concentration is desired the injection may be given each 12 hours. While for occasional administration the oily solution is convenient it has seemed to me that where long courses of treatment are needed it would be inadvisable to inject such a large amount of oil and calcium into the tissues. Romanski, however, reports no parafinomas in over 4,000 injections. Oral administration will probably prove to be the method of choice in the near future. Until such a time as the problem of inactivation by the gastric juices has been solved (and this does not seem to be such a problem as it was first thought to be) and until we can speed up its absorption from the small bowel and know more about the blood levels attained by oral route, the intramuscular route is the one of choice. Penicillin may also be given sublingually in tablets of 50,000, 60,000 and 92,000 units. Effective blood levels have been reported in most instances by Dalkart, Halpern and Larkin.

The local use of penicillin has in general not compared with its efficacy as a systemic agent. It has seemed of value particularly in the treatment of suppurative arthritis as daily injections in saline of 20,000 to 50,000 units along with systemic administration, in empyema as daily injections following aspiration and in meningitis due to susceptible bacteria. Injection into abscess cavities has never seemed to me to be quite comparable to its use in the serous cavities just noted. During the war a mixture of penicillin and sulfathiazole was used as local implantation into wounds, but this practice was not taken up by the American Army Medical Service to any extent since all local applications had been given up except for injection into joints and pleura.

Toxic reactions or unfavorable side-effects are still moderately frequent despite the greater refinement of the present day product. These include reactions thought to be due to the drug itself, and those due to impurities. Of the reactions due to the drug itself may be noted fever, urticuria, dermatitis, gastrointestinal symptoms,

thrombophelebitis (from intravenous injections) and of those thought to be due to impurities are chills, fever, headache, flushing, pain at site of injection, tingling in the testis, cramps, eosinophilia, and so forth. Many of the symptoms are very suggestive of histamine reactions and as a matter of fact benadryl, pyribenzamine and calcium gluconate seem helpful when the symptoms are severe. We have observed an eighth nerve deafness which came on during penicillin treatment in a patient with proteus septicemia. The process slowly subsided after cessation of treatment although penicillin and later streptomycin were not discontinued because of the deafness.

Streptomycin is the result of a concentrated research on the part of Waksman and his colleagues at the New Jersey Agricultural Station. The agent sought was one "exerting a bacteriostatic and bactericidal effect upon gram negative bacteria . . . not only in the test tube but in the animal body, yet not very toxic nor exerting other undesirable effects . . . not inactivated by the body fluids." Nearly 10,000 cultures were examined before a suitable agent was found. Streptomycin, prepared from a culture of streptomyces griseus, was found to be highly effective against over 80 per cent of freshly isolated gram negative organisms. It inhibits many aerobic gram negative and gram positive bacteria, but is not effective against anerobic clostridia. About 85 per cent of penicillin resistant cocci are sensitive to streptomycin and the converse holds in general for streptomycin resistant cocci and penicillin sensitivity. To be emphasized is the great variation in sensitivity of bacteria even among different strains of the same species.

The unit of streptomycin is a very tiny unit and is hardly comparable in magnitude to the unit of penicillin. The original or S unit of the drug is that quantity which when added to 1 cc. of a nutrient medium will just inhibit the growth of a certain strain of E. coli. Since this bacterium is fairly resistant and the quantity of material small, it is difficult to compare this S unit with the Oxford unit of penicillin which is the amount of penicillin which will inhibit the growth of a fairly sensitive staphylococcus culture in 50 cc. of culture medium. There are two other units by which streptomycin is measured, viz., the L unit which is the amount of drug required to inhibit growth of the test organism in 1 liter of medium, and the G unit based on pure streptomycin base. The G unit is approximately equal to 1,000 L units and 1,000,000 S units.

The toxicity of the drug is low in therapeutic doses and the margin of safety is high although unpleasant reactions have been recorded in about 20 per cent of cases, the incidence increasing with increasing doses. Much of the toxicity in the earlier preparations especially is due to impurities but even with increasing purity of the product there still have been a number of undesirable side reactions presumably due to streptomycin itself. With less highly purified preparations histamine-like reactions have been observed consisting of nausea, headache, malaise, rash, arthralgia and drug fever. In animals a fatty metamorphosis may occur in the liver and kidneys, a phenomenon not observed to occur in man. Skin eruptions and fever have been observed and may be accompanied by eosinophilia. Neurologic reactions, particularly 8th nerve involvement, vertigo, tinnitus, deafness —occasionally diplopia has been observed—and paresthesias of the extremities may come on early and last for a few days to a couple of months. It is thought by some that in cases in which deafness appears there may be some permanent change which is compensated.

In the experimental animal streptomycin was found to bear out the in vitro observations. Very significant, have been the experimental studies of Hinshaw and his associates on tuberculosis in guinea pigs. Gram positive organisms have been found in general to be more resistant than gram negative, but mice have been successfully protected against certain strains of staphylococci and diplococcus pneumoniae. Experimental tularemia in mice which ordinarily produces 100 per cent mortality has been completely reversed to 100 per cent survival with adequate amounts of streptomycin.

Streptomycin is usually administered intramuscularly, but may be given intravenously and subcutaneously. When given by the intramuscular route an average of 66 per cent is eliminated by the kidneys and only some 2 per cent by the bowel. Some surgeons advise the addition of 1 ccm. of 1 per cent procaine to the solution used for intramuscular injection to control the minimal pain. The drug should be given in doses sufficient to bring the blood level up to from 4 to 32 micrograms per ccm. This will require a daily amount of 2 to 4 grams given in divided doses every 3 to 4 hours. The amount noted above will yield a urine concentration of 500 to 2,000 units per ccm. Since there are several variables to deal with, namely, the sensitivity of the organism in question, and great individual variation in rates of absorption and excretion among patients or in the same patient from time to time, absolutely dependable information as to dosage would have to come from sensitivity tests on the bacteria concerned and determination of the blood and urine titre. Oral administration is of no value so far as systemic effect is concerned since it is not absorbed from the bowel where it remains for a consider-

able period before passing out in the feces. It has been shown to be of value in controlling the bacterial flora of the bowel and has been used successfully in the preoperative preparation of the bowel. It may be administered intrathecally for treatment of meningitis due to susceptible bacteria (Salmonella, E. Coli) since very little of the antibiotic reaches the canal following intravenous or intramuscular injection. Since it is excreted in the urine where it may reach effective levels very quickly it acts as a urinary antiseptic of great value. Following parenteral administration streptomycin appears in the blood, urine, aqueous and vitreous humors, the bile, the pleural fluid, amniotic and ascitic fluid. Very slight traces are found in the cerebrospinal fluid although the amount may be considerably increased in case of meningitis.

The clinical applications of streptomycin in surgery are just beginning to be appreciated. It seems likely that streptomycin will not be as universally applicable as penicillin for two reasons: First, the frequent bacterial offenders with which the surgeon has to deal are the staphylococcus and streptococcus against which streptomycin is not as potent as penicillin and second, the decided tendency for bacteria to develop tolerance to streptomycin. This tendency for bacteria to develop resistance to streptomycin is a very real thing and must be taken into consideration whenever the drug is given. The increase in resistance may be several thousand fold so as to render it impossible to attain a blood or urine level capable of controlling the bacterial growth. Once resistance has developed nothing can be done to resensitize bacteria to the drug. Further treatment with streptomycin even after several months have elapsed is ineffective. Therefore in cases where streptomycin is used large doses should be given at the start to control the infection, otherwise small doses will simply lead to bacterial resistance. The surgeon must also make sure that he corrects all conditions both local and general favoring bacterial growth since these may prevent adequate response. To be taken into consideration also is the fact that in vitro resistance of gram positive cocci may be increased as much as 8 fold by blood and serum so that the blood level to be attained may need to be 4 to 8 times the in vitro level.

In urinary tract disease in which infection is so frequently due to gram negative organisms response in many cases has been remarkable. The organisms frequently encountered in urinary tract infection which under favorable conditions respond to streptomycin therapy include E. Coli, Ps. aeruginosa, P. vulgaris, Aerobacter aerogenes, Alkaligenes faecalis, Klebsiella pneumoniae, Hemophilus influenzae, as well as some strains of staphylococci and streptococci. Accurate bacteriologic studies should be made to ascertain not only the types and strains of bacteria present but also their susceptibility to the agent. Large doses of the drug should be given from the start so as to prevent the development of tolerance. The urinary levels are much lower if there is marked renal impairment. It must also be remembered that streptomycin will not remove obstructing lesions, dissolve stones or destroy tumors, will not correct a large prostate or diverticulum. If these conditions are not corrected the infectious complications may either not respond or may promptly recur when treatment is stopped. More serious yet possibly is the fact that the infection may not respond on a second trial after the lesions have been corrected because of the development of a high tolerance of the bacteria to the drug. This has been well exemplified in the treatment of cord bladders in paraplegics in whom an initial sterilization of the bladder is followed by prompt recurrence of infection when such factors as suprapubic fistulae, calculi, residual urine are present or if repeated catheterization is required. Streptomycin acts best in an alkaline medium, its optimal pH being 9. Hence in acid urine it may be ineffective whereas changing the reaction of the urine to alkaline may lead to rapid elimination of the infection.

Tularemia responds quickly to streptomycin as was promised by the in vitro tests and animal experiments. There is almost immediate relief from the general symptoms, the temperature drops to normal in 24 to 48 hours, and a disease which ordinarily lasts several months is cured in several weeks or less. The dosage need not be high. Foshay and Pasternack suggest 60,000 to 125,000 units every three or four hours for from 5 to 7 days.

Bacteremias due to susceptible organisms show a response comparable to that seen in the case of penicillin. While it is particularly the gram negative organisms that respond it must be remembered that certain gram positive bacteria, such as some strains of staphylococci, may also respond and also that in the case of some of these latter organisms certain strains may respond to streptomycin and not to penicillin. In the National Research Council report there were 91 cases of bacteremia due to various organisms, with a mortality of 28.7 per cent. Of the 65 patients surviving it apeared that all but four had been definitely helped by the streptomycin. The number of cases for any organism was quite small so that any conclusions regarding specific types of bacteremia must await larger series. However, of 34 E. coli bacteremias there were only 8 deaths.

of 5 P. vulgaris there were no deaths, of 10 Pseudomonas aeruginosa there were 4 deaths, of 6 Aerobacter aerogenes there were 2 deaths, of 6 staphylococcal bacteremias there were 2 deaths, of 7 unidentified streptococcal bacteremias there were 3 deaths. Many other factors such as age, extent of the process, associated states, and so forth, must of course be taken into consideration in these cases, and it must be remembered that many of the patients used in the Research Council study were gravely ill at the time treatment was started and that the test was quite severe.

Of great interest is the use of streptomycin in the treatment of various types of tuberculosis. Experimental work on guinea pigs by Feldman and his colleagues at the Mayo Clinic has shown that by continuous treatment over a period of 6 months with relatively enormous doses, tuberculous lesions regressed in all pigs. In 30 per cent all evidence of tuberculosis disappeared, while in 70 per cent no evidence of progression was seen although residual lesions could be demonstrated. Hinshaw, Feldman and Pfuetze of Rochester, Minnesota, have now some 100 human cases which have been treated for a long enough time to warrant some conclusions as to the effect of the drug on the process in man. The results as given in their report are the most authoritative we have to date on the use of streptomycin in tuberculosis. They report the use in miliary tuberculosis, tuberculous meningitis, non-surgical pulmonary tuberculosis, ulcerating lesions of the upper respiratory tract, tuberculous empyema and fistulae, genitourinary tuberculosis, and lesions of the bones and joints. While it is evident that streptomycin is the most promising agent so far produced for the treatment of tuberculosis it is not a dramatic cure. Regression of lesions after long periods of treatment, the closing of sinuses, and healing of lupus have all been observed; in meningitis there has been improvement in half the patients treated with survival of 2 to 10 months and with almost normal spinal fluid in 2 cases. Non-surgical pulmonary tuberculosis has shown an encouraging response in a high percentage of instances. Although the disease was not eradicated it was suppressed in many and it would seem that the drug might hold the infection in check until natural processes effect a cure. The use of streptomycin as pre- and postoperative adjunct seems valuable in lesions amenable to surgery. In tuberculosis of the urinary tract temporary benefit may be expected in many cases but cure cannot be anticipated. Streptomycin is no substitute for surgery here. Since the period of treatment is 3 to 6 months with doses of 1.5 to 3.0 grams daily, and since we cannot assure cure in any reasonable number of cases it is to be concluded that much further study must be made before streptomycin treatment for tuberculosis can come into general or practical use.

In peritonitis following rupture of the bowel, appendiceal rupture, etc., it has been hoped to find the answer to the control of the gram negative flora usually present. A number of instances of post-appendiceal peritonitis, peritonitis following operation, ruptured diverticulae, abortion, etc., successfully terminated under streptomycin have been reported. In certain cases penicillin has been used in conjunction with it and not without some good basis since in many ways the two drugs complement each other in their effect upon some strains of staphylococci and streptococci. In ulcerative colitis streptomycin fails to arrest the disease but in some instances lowers the temperature during the exacerbations. The drug has been disappointing in the treatment of typhoid, salmonella and brucellosis infections. Favorable response has been recorded in the treatment of hemophilus influenza, meningitis and pneumonia and in Friedländer's pneumonia. Local suppurative processes such as abscesses of the brain and breast, intra-abdominal abscesses, liver abscess, etc., have also responded to the drug in a significant number of instances.

In the treatment of wounds streptomycin does not at the moment appear to have the field of usefulness of penicillin. The organisms against which it is especially valuable are not quite the ones which are the major contaminants. Here penicillin is the antibiotic of choice. Howes has advocated use of a mixture of streptomycin and marfanil as topical agent in open wounds. To those of us who have gone through the experience of battle casualty wounds and the initial enthusiasm for local drugs followed by the gradual change of opinion regarding their efficacy until finally the local use was entirely given up, the idea of going back to local implantation comes a little difficult.

Lack of response to streptomycin may be due to the same factors as enumerated for penicillin, that is, non-susceptible organisms; the development of resistance to the drug; anatomic or physiologic conditions which should first be corrected.

We are plagued with the same problems of existence as are our humble friends of the soil and who can grumble if man in his superior intelligence has simply borrowed from them, as result of chance observation, agents they have found useful in their struggle to maintain themselves. Our own natural antibodies are numerous and have arisen in us with no greater effort on our part than in the case of the various fungi. We have a certain advantage over the fungi, not so

much in producing anything new or devising new principles, but in that by observation we can discover natural laws and processes and to some degree we can make use of the things we dscover. As to actually producing a new agent we have not approached the antibiotics. In our use of them we must not lose sight of the patient or of the entire disease complex from which he is suffering. Failure to obtain results may be due to inadequate dosage, low therapeutic concentration, non-susceptible organisms, inadequate surgical drainage, far advanced disease, or general depletion of the patient, and above all failure to observe surgical principles. The antibiotics, as Fleming has said, simply attack the bacteria—the surgeon must treat the patient.

Table showing the in vitro sensitivity to penicillin and streptomycin of the more common bacteria. The in vivo sensitivity is roughlv parallel to the in vitro sensitivity. Although it is to be noted that streptomycin is effective against a number of gram positive organisms in general penicillin is more effective, while with the exception of Neisserian infections in which penicillin is the agent of choice, streptomycin is to be used for all gram negative infections. It should be remembered that the sensitivity is relative in many cases and that in some instances very large doses and high blood and urine levels will be effective in cases thought unsuitable for antibiotic therapy.

Organism	Sensitive to Penicillin	To Streptomycin
Actinomyces bovis	+	+
B. anthracis	+	+
Clostridia of gas gangrene	+	—
C. diptheriae	+	+
D. pneumoniae	+	+
N. gonorrheae	+	+
Vincent's angina organisms	+	?
Staphylococci	+	+
Streptococci	+	+
Trep. pallidum	+	sl.
Aerobacter aerogens	—	+
B. abortus	—	+
E. Typhosa	—	+
E. coli	—	+
H. influenzae	—	+
Friedlander's bacillus	—	+
M. tuberculosis	—	+
P. tularensis	—	+
Salmonella and Shigella	—	+
Proteus vulgaris	—	+
Ps. aerugmosa (pyocyanea)	—	+

Bibliography

Altemeier, W. A., Wadsworth, C.L. Penicillin—Its use in surgery and influence on earlier types of chemotherapy. Surg. Gynec. & Obst., 1947, Vol. 84, p. 540.

Hinshaw, H. C. Clinical Uses of Streptomycin in Medicine and Surgery. Surg. Gynec. & Obst., 1947, Vol. 84, p. 579.

Briggs, C. W. Antibiotic Agents and Some General Principles of Antibiotic Therapy. J. National Med. Assoc., 1947, Vol. 39, p. 45.

Duemling, W. W., Duncan, G. G., et al. Antibiotics. Ann. N.Y. Acad. Sciences, 1946, Vol. 48, p. 31-218.

Kleinman, A. M., Shearer, F. P., Sprinz, H. Streptomycin Therapy in Urinary Tract Infections. J. Urol. 1947, Vol. 57, p. 599.

Lyons, Champ. Chemotherapy in the Management of Wounds. J.A.M.A., 1947, Vol. 133, p. 215.

Hinshaw, H. C., Feldman. W. H., Pfuetze, K. H. Treatment of Tuberculosis with Streptomycin. J.A.M.A., 1946, Vol. 133, p. 778.

Fowler, G. P., Seligman, E. Otitic Complications of Streptomycin. J.A.M.A., 1946, Vol. 132, p 915.

Zintel, Wiley, Nichols and Rhoads. The Use of Streptomycin in Surgical Patients. Surgery, 1947, Vol. 21, p. 175.

Keefer, C. S., Blake, F. G., Lockwood, J. S., Long, P. H., Marshall, E. K., Jr., Wood, W. B., Jr. Streptomycin in the Treatment of Infections. J.A.M.A., 1946, Vol. 132, p. 4-11 and 70-77.

Pulaski, E. J., Amspacker. Streptomycin Therapy for Bacteria. Am. J. Surg., 1947, Vol. 73, p. 347.

Pulaski, E. J., Sprinz, H. Streptomycin in Surgical Infections. I. Laboratory Studies. Ann. Surg., 1947, Vol. 125, p. 194.

Pulaski, E. J. Streptomycin in Surgical Infections. II. Infections of the Urinary Tract. Ann. Surg., 1946, Vol. 124, p. 392.

Howe, C., Coriell, L. L., Bookwalter, H. L., Ellingson, H. V. Streptomycin Treatment in Tularemia. J.A.M.A., 1946, Vol. 132, p. 195.

Knop, C. Q. Experimental Study of the Development of Resistance to Streptomycin. Proc. Staff Meeting, Mayo Clinic, 1946, Vol. 21, p. 273.

Meleney, F. L. Penicillin in the Treatment of Established Surgical Infection. Ann. Surg., 1946, Vol. 124, p. 962.

TUBERCULOSIS

Tuberculosis Lymphadenitis

V. J. Hagen, B.Sc., M.D.,
St. Boniface Sanatorium, St. Vital, Manitoba.

The investigations of the twentieth century have done much to clarify the classification and understanding of disease affecting the lymphatic system, particularly those affecting the lymph nodes. The presence of an enlarged node or nodes has become a diagnostic challenge which practitioners accept zealously until the cause has been proven and the appropriate therapeutic measures instituted. Unfortunately, many of the lymphadenopathies carry grave prognoses. Tuberculous adenitis, however, if adequately treated usually yields excellent results. As with tuberculosis in any organ, early diagnosis offers the greatest chance of complete arrest of the disease process.

The incidence of tuberculous adenitis is decreasing, mainly due to food inspection, milk pasteurization, and the prevention of massive infection in childhood. In 1945, of 5,559 tuberculosis deaths in Canada only 15 were due to tuberculous adenitis per se (0.27%). The incidence is higher but it is virtually impossible to give an exact figure since many cases are not detected and others not reported. Infection may occur at any age but the majority of cases are seen in childhood and early adult life. Both sexes are affected equally.

Lymph nodes may be involved in any part of the body and various classifications have been advanced for tuberculous adenitis. For practical purposes two classifications merit discussion—regional and pathological. The former lends itself admirably to the task as the nodes are usually considered in regions or groups; e.g., cervical, axillary. The commonest sites are cervical, tracheobronchial and mesenteric.

Pathologically, three varieties exist: (1) **Epithelioid**—scattered tubercles are seen in the node accompanied by a lymphoid or epithelioid reaction, usually the latter. Caseation follows and the node may discharge onto a surface. (2) **Diffuse Hyperplastic**—may be epithelioid or lymphoid in character and caseation is minimal or absent. The nodes enlarge slowly and may remain stationary for prolonged periods. Hardening and induration are followed by fibrosis and contraction which arrest the process. Generalized involvement of this type causes a clinical syndrome simulating Hodgkin's disease. (3) **Acute Caseating**—this type is usually found in overwhelming infections. The other phases of tuberculous reaction—tubercle formation, epithelioid and giant cells—are scanty and the nodes rapidly become caseous masses. Any or all types may be found in the same individual but there are cases in which the forms are sufficiently well defined to constitute both clinical and pathological entities.

The route of the invading tubercle bacilli in lymph node tuberculosis is subject to wide controversy. Infection by direct passage of bacilli from tonsils, gastrointestinal tract, skin lesions, etc., to regional nodes is accepted by most authorities. Both orthograde and retrograde lymphatic spread occur. This theory has been found lacking in many instances and recently the hypothesis that the bacilli gain access to the circulation from an unsuspected focus by way of the thoracic duct and cause nodal tuberculosis has been advanced. The latter explanation brings adenitis in line with the accepted mode of infection in other tuberculous conditions such as, bone and joint, renal, etc.

In tuberculous adenitis, as with carcinoma of the breast, it is possible to correlate the clinical findings and the pathological changes, especially when the involved nodes are easily palpable; e.g., cervical adenitis. Only one node may appear to be diseased but usually several members of a group will be involved and various stages may be found at the same examination. The process may be divided into six stages:

(1) The gland increases in size but remains soft and freely movable. Microscopic examination reveals a cellular reaction with some giant cell formation.

(2) The gland increases in size clinically and tubercle formation is visible to the naked eye as grey or yellowish patches in the node substance.

(3) As the process evolves the gland becomes harder on palpation and on section the node substance has been replaced with masses of caseous material. This is somewhat paradoxical as the pathological process is softening and clinically the gland feels hard.

(4) The hardened node becomes adherent, particularly to the more superficial structures, due to a periadenitis which also restrains the discharge of the caseous core.

(5) On examination one finds a subcutaneous fluctuant swelling overlying the more deeply seated diseased node. The node can still be felt distinctly. This is due to the discharge of the nodal contents through a hole in the capsule causing an abscess in the superficial layers.

(6) The overlying skin becomes reddened, thins out like parchment, and eventually breaks down to allow the escape of the nodal debris. This results in sinus formation.

In acute simple adenitis with abscess formation the skin becomes red, swollen, and oedematous and fluctuation is elicited only at the centre of the swelling. These changes are of importance in differential diagnosis. Healing can and does occur at any stage. In early involvement resolution can occur but usually healing is by contraction, fibrosis and calcification. In the later stages with sinus formation healing is by granulation, fibrosis and scar tissue.

The clinical picture will depend on the site and stage of the disease at the time the patient presents himself for diagnosis. Constitutional symptoms vary widely but usually there is some attendant discomfort from the enlarged nodes, weakness and low-grade temperature. The sedimentation rate is elevated slightly at first and rises sharply if the nodes discharge on the surface. The blood count shows a lymphocytic response and a mild secondary anaemia. Other signs and symptoms point more specifically to the area affected. Mesenteric adenitis causes recurrent abdominal discomfort, usually in the right lower quadrant, with associated gastroirtestinal disturbance. The bowels tend to be costive but if ulceration is present diarrhoea may occur. Physical examination may reveal enlarged palpable glands in the abdomen with associated tenderness and some guarding.

Mediastinal adenitis is often associated with a harsh, raspy, dry cough. Chest pain is an inconstant feature but when present is often over the upper thoracic spines. Various other signs and symptoms have been described, among which are wheezing, dyspnoea, stridor, hoarseness, venous congestion, Horner's syndrome, etc. Physical examination often is entirely negative. When pressure effects are present signs of a poorly drained segment of lung may be found. Roentgen ray examination will usually demonstrate mediastinal enlargement.

The diagnosis of tuberculous adenitis is often very difficult. When classical findings are present the diagnosis is easily made for few, if any, conditions simulate it. History of contact or the presence of scars of previous attacks may provide valuable clues. A negative mantoux test is of value in excluding the diagnosis since practically all cases of nodal tuberculosis are positive reactors. The Wassermann reaction will rule out syphilitic infection. Observation on a rest regime is often necessary since progressive changes in the nodes may clinch the diagnosis. Failing this, biopsy, particularly if the glands are easily accessible, is indicated.

The **differential diagnosis** comprises simple adenitis, infectious mononucleosis, syphilis, leukaemia, Hodgkin's disease, lymphosarcoma, and secondary carcinoma. Mesenteric involvement may be confused with appendicitis.

Many **methods of treatment** for tuberculous adenitis have been advocated but few have stood the test of time and usage. The site and stage of the diseased nodes dictate the line of treatment to be followed. All cases require a rest regime of varying duration. Many modes of treatment have no doubt lost favour because they have been advocated as substitutes for rest, rather than in conjunction with it. No medicinal preparations have proven of value in the past and to date streptomycin has had little effect on this form of tuberculosis. As an adjunct to rest surgery enhances the prognosis greatly.

The choice of physiotherapeutic measures lies between surgery, Roentgen ray therapy, and heliotherapy. In some instances a combination of two or all three of these methods is necessary. As a general rule if **operative interference** is decided upon it should be conservative. Simple repeated aspirations may prevent sinus formation when the nodes are in stage five. The needle should be inserted through healthy tissue into the diseased area rather than directly over the fluctuant area. In the hands of some operators local excision has obtained excellent results. Most authorities, however, reserve operative interference either for primary foci such as carious teeth, tonsils, and skin lesions or for poor late results.

Roentgen ray therapy is usually reserved for superficial groups of nodes, particularly when they are in the first three stages. Arrest or even regression of the disease process usually ensues. Hauser advocates 150 r units, using copper and aluminum filters, every 10 days for 10 doses. In his paper he reports 88.5% satisfactory results. In assessing radiation therapy one must not lose sight of the fact that many of the cases would respond to a rest regime alone. In the more advanced stages of tuberculous adenitis Roentgen rays are not as effective. Caseation and softening are sometimes accelerated and sinus formation follows. Deep seated nodes; e.g., mediastinal, are usually treated conservatively and radiation is reserved for those cases which manifest pressure symptoms; e.g., bronchial obstruction. Heliotherapy locally to sinuses is often useful in promoting healing but has proven disappointing in the therapy of other stages.

Complications are usually due to the rupture of a gland into a body cavity, bronchus, or blood vessel resulting in lesions such as peritonitis, pleurisy with effusion, aspiration pneumonia, miliary tuberculosis, or meningitis. Unfortunately for some patients these complications may develop long after the original infection. Viable tubercle bacilli have even been recovered from calcified nodes. Thus apparently arrested adenitis may become a focus for endogenous reinfection of the

individual. For this reason patients who manifest evidence of past infection of lymph nodes—sinuses, palpable nodes, or hilar calcification on routine chest films—should have periodic re-examinations in order to detect any exacerbation or complication at the earliest possible moment.

References — Tuberculous Lymphadenitis

The Pathogenesis of Tuberculosis of Peripheral Lymph Nodes; B. C. Thompson. Amer. Rev. of Tuberculosis (abst.), Aug., 1941. 44: 69.

Tuberculous Hilar and Mediastinal Adenopathy in Adults; Windman, Ostrum and Fetter. Radiology, May, 1940. 34: 521.

Anatomical Studies on Human Tuberculosis (XIX); K. Terplan. Amer. Rev. of Tuberculosis, Oct., 1945. 52: 312.

Tuberculosis of the Tonsils; L. J. Rather. Amer. J. of Path., July, 1943. 19: 725.

Roentgen Therapy in Tuberculosis Cervical Lymphadenitis; H. Hauser. Radiology, Sept., 1941. 37: 304.

Radiation Therapy for Obstructing Tuberculous Hilar Lymph Nodes; K. Freireich. Amer. Rev. of Tuberculosis, Jan., 1941. 49: 31.

CARDIOLOGY

The Heart in Pregnancy

Ben H. Lyons, M.D.

One of the most perplexing decisions which the physician or obstetrician may be called to make is to advise women who have heart disease if they might safely become pregnant; or, pregnancy having occurred, whether they should be allowed to go on with it. The problem is made more difficult because normal physiologic changes may simulate heart disease and create confusion. That recognition and proper management of organic heart disease is vital to the safety of mother and child was clearly demonstrated by Hamilton at the Boston Lying in Hospital, (1). (2). (3). In their series, two per cent of pregnant women had organic heart disease, yet twenty-eight per cent of their deaths in pregnancy occurred in this small group. Prior to 1923, 20% of all parous cardiacs died in this hospital. In an attempt to reduce this high mortality, special attention and supervision, which will be outlined, was undertaken. The mortality took an astonishing drop from 20 to 3.5%, and has been maintained around the latter figure since. Other authorities concur with Hamilton that proper management will determine the death rate in this group, and hence be a factor in mortality in pregnancy as a whole.

Understanding of the physiological changes affecting circulation in pregnancy is a prerequisite to recognition of organic cardiac lesions. Landt[4], Cohen[5], Burwell[6], and others have clarified our knowledge of these changes. The fundamental alteration is the occurrence of a great increase in the circulating blood volume. This change begins about the fifth month, reaches a peak of 50% or so above the normal at the 7th month, and declines in the last month—losing about half the increase at that time. There is a corresponding increase in cardiac minute output. The blood dilution accompanying the increased volume results in a moderate anemia. The universal occurrence of a moderate hemoglobin reduction to 70 or 80% in pregancy is therefore a normal and physiologic finding. The placental circulation functions somewhat as an arteriovenous shunt with resultant increase in pulse pressure during pregnancy. Because of the increased blood volume and this arteriovenous shunt, the work of the heart is increased 50% and more during the latter part of pregnancy.

Anatomical or rather positional changes are caused by the upward pressure on the diaphram by the enlarging uterus. The heart comes to lie transversely so that there is an apparent increase of 3-6 cms., in its transverse diameter. The electrical axis is likewise shifted and a cardiogram will usually show left axis deviation, with perhaps a Q_3, a negative T_3, and occasionally a negative T_2 . . . Murmurs not previously present are frequently heard. Different explanations are invoked —increased blood volume, kinking of pulmonary vessels, or greater capacity of heart chambers. A loud pulmonary systolic murmur may suggest congenital heart disease, or an apical systolic murmur mitral regurgitation. Circulation time is unchanged, venous pressure is normal in the upper extremities although increased in the lower, and the vital capacity remains normal till the last month.

In view of the changes above mentioned, recognition of heart disease in pregnancy is not always easy. Hamilton, and also Jones[7], and Bellet[8], have outlined criteria and classifications. Patients in whom cardiac disease is suspected may be divided into three main groups, viz False Cardiacs, Possible Cardiacs, and Definite Heart Disease.

(1) False Cardiacs — Slight edema and shortness of breath in the last part of pregnancy are normally encountered. There are, in addition, a large group of patients who complain of fatigue, praecordial pains, palpitation, and shortness of breath—in other words, the symptoms of neurocirculatory asthenia. On examination, the detection of cardiac enlargement and murmurs might cause one to ponder as to the presence of organic lesions. A careful evaluation of the symptomatology and personality of the patient will provide the answer. The dyspnoea occurs at rest as well as on exertion, is often sighing in type, and is

related to emotional episodes. Palpitation occurs under similar circumstances. Chest pain is submammary, aching or stabbing, and not definitely related to effort or relieved by rest. The heart murmurs will be found to be systolic in time, usually of moderate intensity without wide transmission, and varying with changes in phase of respiration or position of the patient.

(2) Possible Cardiacs—In this group will be the patients who in addition to murmurs have a history suggestive of rheumatic infection; or in the absence of such a history if the murmur is loud, blowing, and transmitted. In many of these cases it will not be possible to state that the patient has or has not got rheumatic mitral regurgitation. Fortunately, this problem will be of academic interest only. Mitral regurgitation does not increase the hazard, or require special care, in pregnancy; and for practical purposes such a murmur by itself may be disregarded.

However, it is important to satisfy oneself that some other lesion, particularly mitral stenosis, is not also present. At the first prenatal visit careful ausculatation should be carried out. A loud first apical sound and snapping pulmonary second may be suggestive, but is sometimes normally heard in pregnancy. Faint apical diastolic murmurs may sometimes be heard only with a bell stethoscope, after exercise, in the left lateral position, and over a small area at or just medial to the apex. If in doubt, fluoroscopy may help to give the answer.

(3) Definite Organic Heart Disease—The vast majority of these will be rheumatic in origin. There will be some hypertensive, and occasional congenital, thyroid, luetic, or coronary cases. According to the lesions present, and, more important, the functional state of the circulation, favourable and non favourable groups may be recognized. As being by far the commonest, the rheumatic problem will be discussed first and then mention made of the other conditions.

The following mortality figures will indicate the prognosis and hence grouping of rheumatic lesions:

Favourable—

Mitral regurgitation	½ - 1%
Mitral stenosis	3 - 5%
Aortic insufficiency	5 - 6%
Aortic insufficiency and mitral stenosis	5 - 6%

Unfavourable—

Auricular fibrillation	33%
History of failure	33%

To be placed in the favourable group, there must therefore be no history of failure—however mild; and no fibrillation. Marked cardiac enlargement, rheumatic infection, or complications such as hypertension, renal or pulmonary disease, diabetes, etc., will also place the patient in the unfavourable group.

Mitral regurgitation, uncomplicated, carries no greater hazard than if the patient were not pregnant. Paul White[9] classes aortic regurgitation as unfavourable. However, all other authors feel that this lesion is no more unfavourable than mitral stenosis, alone or combined. Aortic stenosis, according to Bellet, offers a more serious prognosis.

Individual patients will, of course, be more or less favourable or unfavourable. Jones divides off an intermediate group of valvular disease without failure, but who have moderate enlargement or who had some exercise intolerance before pregnancy.

The ultimate prognosis in rheumatic heart disease is not unfavourably influenced by pregnancy. That is, if the patient survives the pregnancy she will live as long as if she had not been pregnant (Boyer-Nadas[10]).

The indications for treatment in the unfavourable group, in view of the appalling mortality of one-third, are clear cut. Pregnancy must be avoided. If the patient presents herself in the first trimester of pregnancy, termination is called for, **after control of any failure which may be present.** If first seen in the latter months, she is to be treated for failure, and carried along as will be outlined later.

In the favourable group decision will not be so easy, because many other questions, medical and otherwise, will complicate the problem. For example:

What is the age of the patient? After 35 the danger of failure is doubled. Whatever family she will have, should therefore be acquired while young.

Has the heart disease deteriorated since a previous pregnancy? If so, advise against further childbearing.

Is there considerable cardiac enlargement or any exercise intolerance? Some authors class these as unfavourable and forbid pregnancy. Others take an intermediate position.

How many children has she and how anxious is she to have a child? Nearly all agree that two should be the maximum, although Levine[11] leaves it optional with the parents if a third is desired.

What are the economic and social circumstances? The ability to secure domestic help during the pregnancy and for the later care of the infant are of great importance, so that the mother can get the rest prescribed for her. It must not be forgotten that the care and upbringing of the infant may impose a greater strain than the pregnancy itself.

What co-operation may be expected from the patient? Close supervision by the physician and adherence to the management outlined for the patient are essential. The physician cannot assume responsibility for the care of a patient who will not co-operate with him.

What are the religious views and convictions of the patient? These always require consideration, especially if termination of pregnancy is contemplated. It may be pointed out here that if the pregnancy is dangerous to the mother, it is two to five times as lethal to the child.

In spite of our most careful analysis some patients will surprise us by doing well and others will develop failure unexpectedly. Many of us know of women who have mitral stenosis and have reared big families without harm. The hazard is always there, however, and the patient should know that a risk is involved.

Women who have heart disease should always be told to present themselves for examination at once should pregnancy occur, so that their condition may be evaluated and a decision made as to continuance of pregnancy. In unfavourable cases termination of pregnancy is advised (as soon as any failure present is treated). In the favourable group pregnancy is allowed to continue unless the other factors which have been discussed are wholly unsatisfactory.

The instructions given to the patient are somewhat different to the ordinary prenatal regime. Visits to the office should be at frequent intervals, such as every two weeks, and any untoward symptoms are to be reported at once. She is to get a good nights sleep plus rest periods totalling two or three hours throughout the day. If compensation is perfect, moderate exercise is desirable; but excessive exercise, prolonged shopping trips, etc., are to be avoided. We must remember that the heart is already working 50% harder than normal, and the diseased organ should not be burdened further. Any activity should be discontinued as soon as fatigue is noticed. An infection, even a common cold, demands immediate bed rest and medical supervision, because activation of rheumatic activity, or precipitation of failure, may occur. Excessive weight gain is undesirable, and moderate salt restriction should be practiced.

The fifth to seventh months are critical periods. Development of cough, dyspnoea, or haemoptysis should be reported to the physician. Evidences of failure should be looked for at each visit. The commonest early sign is persistent basal rales. Levine believes that periodic vital capacity determinations are useful in determining the onset of failure.

At the first sign of failure bed rest, preferably in hospital, is mandatory. The usual cardiac regime is instituted—low salt diet, with acid ash or ammonium chloride, diuretics, and digitalis. Fluids are given freely, it having been shown that edema is not aggravated by this measure, providing that sodium is restricted. The evidence for this has been reviewed in the June issue of the Manitoba Medical Review by Gemmell[12]. The same treatment, except for mercurials, will be indicated even in presence of toxaemia. Page and Cochrane[13] state that the treatment of edema is the same in this respect whether toxaemic or cardiac in origin. The latest edition of DeLee and Greenhill[14] no longer mentions fluid restriction in the treatment of preeclampsia.

If the failure has occurred in the first three or possibly four months, the pregnancy is terminated. On no account, however, must this be done until failure has been treated. In the latter half of pregnancy, interference carries a high mortality. The patient must be carried along medically, and this will means rest, usually in bed, preferably in hospital. Owing to the frequent occurrence of phlebothrombosis, sitting up or bathroom privileges are advisable where possible.

The time and method of delivery have been controversial questions. The former attitude has been to carry the patient along till the child is visible, when induction or Cesarean section was performed. Cesarean section was perferred because there was a considerable mortality with induction. Gorenberg[15], and Mendelson[16], have shown that the strain on the heart is eased during the last months as the blood volume declines, and that patients who have been carried thus far do better by being allowed to go to term. Delivery by the vaginal route was shown by them to be much the safest procedure providing the second stage was shortened by episiotomy and forceps. Cesarean section should be reserved for obstetric indications.

There is one condition in which an exception to the above plan may be required (see Hamilton). Occasionally a patient with mitral stenosis will suddenly, for no apparent reason, develop acute pulmonary edema with severe haemoptysis. If she recovers from the attack recurrences are prone to occur and may be fatal. It is wisest not to delay but to terminate pregnancy after the first attack.

Death during labour is unusual if the patient has been treated beforehand. If danger signs appear, cervical incision or manual dilation and extraction are indicated. Vigilance should not be relaxed after delivery. The change in circulatory dynamics may precipitate failure within a few hours after childbirth, particularly in mitral stenosis and congenital septal defects. Death may be due to complications, failure per se accounting for about half only of fatalities. Embolism, bacterial endocarditis, sepsis, toxaemia, and intercurrent diseases account for the others.

Progress in antibiotic and anticoagulant therapy should have a favourable influence on some of these complications.

Much of what has been said with respect to rheumatic disease will apply to other less common types. A brief consideration will be given to these.

Hypertension — Hypertension predisposes to toxaemia, one-third of hypertensives developing this complication. After pregnancy, hypertension may be more severe than before, particularly if toxaemia had developed. Mild hypertension should be viewed with about the same seriousness as mitral stenosis. Severe hypertension, especially when marked eye ground changes or renal disease are present, carries a mortality figure of 17% and contraindicates pregnancy. Blood pressure of the order of 160-180 systolic and 90-100 diastolic would probably be borderline.

Congenital Heart Disease — Non-cyanotic patients with no evidence of failure do not do badly and can be handled in a similar manner to the favourable rheumatic group. In septal defects, however, there is some danger of collapse immediately after delivery. Cyanotic cases are, of course, unfavourable.

Luetic—Free aortic regurgitations is not as favourable as rheumatic. Aneurysm contraindicates pregnancy.

Cor Pulmonale—Do quite well; the strain of pregnancy is on the left ventricle, not the right, and the vital capacity is not impaired.

Coronary—Should not become pregnant—very unfavourable.

Thyrotoxicosis — The treatment in pregnancy does not differ from that in nullipera.

The following table (modified from Jones), is appended to summarize some of the conclusions reached. However, in this, as with other medical problems, statistics and tables are guides only. Clinical judgment will have to weigh the applicability of these aids to the individual case. Perhaps more than in any other field, the desires of the patient will influence our course of action, and the ability to catalogue her prognostically will be of great assistance in advising her as to the risk she will be assuming.

Class	Treatment	
Favourable Group	**Non Pregnant**	**Pregnant**
Valvular lesions (slight enlargement only, age under 35, no history of failure or fibrillation). Hypertension—mild. Congenital—noncyanotic. Cor Pulmonale.	Usually permit two pregnancies (mitral regurgitation—no restrictions).	Allow to continue if doing well, and no deterioration due to previous pregnancies.
Intermediate Group		
Age over 35. Luetic aortic regurgitation. Hypertension—moderate. Moderate enlargement of heart.	If patient anxious, and condition otherwise favourable, allow one pregnancy.	After first pregnancy allow to continue only if no deterioration from first. After two pregnancies better to terminate as in unfavourable group.
Unfavourable Group		
History of failure. Fibrillation. Hypertension—severe. Marked cardiac enlargement. Complicated cases (renal—pulmonary, etc.). Congenital—cyanotic. Coronary.	No pregnancy allowed.	Termination of pregnancy in first trimester. Later in pregnancy carry through, and deliver vaginally at term.

References

1. Hamilton, B. E. and Kellog, F. S. Jour. A.M.A., 1928, 91, 1942.
2. Hamilton, B. E. and Thomson, K. J. The Heart in Pregnancy; Little Brown & Co., 1941.
3. Hamilton, B. E. Am. Heart Journal, 33: 633, May, 1947.
4. Landt, H. E. and Benjamin, J. E. Am. Heart Journal, 1936, 12: 592.
5. Cohen, M. E. and Thomson K. J. Journal A.M.A., 1939, 112: 1556
6. Burwell, C. S., Strayhorn, W. D. et al. Arch. Int. Med., 1938, 62: 979.
7. Jones, A. M. Post Grad. Med. Jour., 20: 176, June, 1944.
8. Bellet, S. Personal Communication.
9. White, Paul. Heart Disease, MacMillan Co., New York, 1945.
10. Boyer, N. H., Nadas, A. S. Annals of Int. Med., 20:99-107, Jan., 1944.
11. Levine, S. Clinical Heart Disease. Saunders & Co. of Philadelphia, 1945.
12. Gemmell, J. Man. Med. Rev., 27: 336, June, 1947.
13. Page & Cochrane. Arterial Hypertension. Year Book Publishers, Chicago, 1945.
14. DeLee & Greenhill. Principles & Practice of Obstetrics. Saunders, Philadelphia, 1947.
15. Gorenberg, B. E. and Thomson, K. J. Am. Jour. Obst. & Gyn., 48: 329, Sept., 1944.

Abstract

Medical Management of Peripheral Vascular Disorders. Bull. N.Y. Acad. Med. 22: 347-414 (August), 1946. Samuel Silbert, New York.

Edited by J. M. McEachern and R. E. Beamish

Some important considerations in regard to the four chief conditions in the field of peripheral vascular disease which require the attention of the general practitioner of medicine are discussed. These conditions are arterial embolism, phlebitis, arteriosclerotic disease of peripheral arteries, and thrombo-angiitis obliterans.

Arterial Embolism

Emboli to the extremities generally arise from diseased hearts and this complication should be anticipated in every case of acute coronary thrombosis and in chronic rheumatic or arteriosclerotic heart disease, particularly in the presence of fibrillation. When confronted with a case of heart disease of this type the physician should make sure that normal pulsations in the hands and feet are palpable, and should make a record of any pulsations which are absent. In such a patient any complaint of sudden numbness, coldness or pain in an extremity should arouse suspicion that an embolism to a major artery has occurred. Confirmatory objective signs such as loss of pulsation in the vessels, pallor and coldness of the extremity, anaesthesia or muscular paralysis of a part, indicate that an emergency requiring prompt action has arisen. Delay in the early recognition of this catastrophe may result in loss of life or limb.

The two most common mistakes made in the treatment of embolism are elevation of the extremity and application of heat. An extremity which has suffered an embolism has been deprived of most of its blood supply and raising it simply further impairs the circulation. The proper position for an extremity suddenly deprived of its blood supply is sloping downward so that the arterial circulation is aided by the action of gravity. In the lower limb this can be achieved by raising the head of the bed so that the level of the feet is below that of the hips. Since the circulation is most precarious in the toes it is an additional safeguard to turn the patient occasionally so that he lies face down with the feet extending over the end of the bed thus making the toes most dependent.

Application of heat is the second commonest mistake. The effect of warming tissues is to increase their metabolic rate and their need for oxygen. When the blood supply has been cut off these needs cannot be met and only harm and pain result from the procedure. In many instances gangrene is due more to the improper use of heat than to the impairment of circulation. Properly, the affected limb should be covered with ice bags until circulation begins to return.

When a major artery is suddenly blocked by an embolism, there is a marked associated spasm of all collateral arteries. The most effective medical means of relieving this spasm is by repeated intravenous injections of papaverine. The recommended dosage is one grain every two hours for four doses, and then every four hours until the circulation appears to be returning safely. Another method of relieving arterial spasm is by temporary block of the sympathetic nervous system by spinal anaesthesia, paravertebral block with novocaine, or by continuous sacral anaesthesia.

Thus the measures which should be promptly instituted in every case of peripheral embolism are (1) lowering of the extremity, (2) application of cold and (3) release of collateral vasospasm by papaverine or sympathetic block.

While medical treatment is being carried out a surgical consultation should be held. If after a few hours no improvement occurs surgical removal of the embolus should be proceeded with. Best results are obtained when operation is performed within twelve hours after the embolism has occurred. Formation of a secondary thrombus at the site of operation on the vessel can be prevented by initiating anticoagulant therapy with heparin and dicumarol before embolectomy is undertaken.

If gangrene develops in spite of all measures taken and amputation becomes unavoidable, operation should be delayed as long as possible in order to allow heart function to improve and to allow time for development of collateral circulation at the site of amputation.

Phlebitis

Superficial phlebitis commonly occurs as a complication of varicose veins, but also occurs as migrating or traumatic phlebitis. The danger of pulmonary embolism is remote as long as the patient is reasonably active. The most common error in treatment is to keep such a paient in bed for weeks; bed rest is only necessary for the relief of pain, and is seldom required for more than 24 hours. Warm moist compresses during this period are helpful. As soon as possible the patient should apply an elastic bandage and return to normal activity.

Phlebitis of the deep veins of the lower extremities is a serious and dangerous condition, often resulting in pulmonary embolism and death, or leaving the patient permanently disabled by a swollen and unsightly leg. It is a frequent complication of operation, confinement or illness, and should be guarded against whenever a patient is put to bed for several days for any condition.

Exercise of the legs several times a day will usually prevent development of deep phlebitis.

The most dangerous period of phlebitis is at the onset when loose thrombi begin to form in the deep veins of the calf. It is during this time, when there is no swelling and physical signs are minimal, that there is gravest danger of fatal pulmonary embolism. Pain in the legs, vague feeling of apprehension, elevation of pulse or temperature, tenderness of the calf muscles, and pain in the calf on dorsiflexion of the foot, should all be regarded with suspicion as indicating the onset of a deep phlebitis.

Surgical treatment, particularly as advocated by several Boston surgeons, is discussed. Some recommend ligation of the superficial femoral vein, others prefer to ligate the common femoral or iliac vessels. In some instances the inferior vena cava has been ligated. To prevent embolism from a possible thrombosis in the second leg a bilateral ligation must be done. Prophylactic bilateral femoral vein ligation has been practiced on elderly patients who are to undergo major surgery. It is stated that femoral vein ligation results in very little, if any, persistent swelling of the legs. The author points out that even bilateral femoral vein ligation is not an absolute safeguard against pulmonary embolism, for in several cases fatal or non-fatal emboli have occurred in spite of this procedure. Such emboli arise from pelvic or other veins, or from the right side of the heart. He also disagrees with the statement that little or no persistent edema results from the operation and describes a case with massive edema of both legs following femoral vein ligation.

The impressive results reported by the Mayo group using anticoagulant therapy with heparin and dicumarol are cited. The advantages of this treatment are that thrombosis and phlebitis are controlled in all parts of the body and not just in the legs, and the inevitable tendency to swelling of the legs from thrombophlebitis is not further aggravated by surgical ligation. The great danger in this treatment is from hemorrhage and it should only be used where facilities for determining prothrombin time and for administration of blood transfusions and vitamin K are available.

It is pointed out that in the stage when obvious swelling of the extremity develops, the danger of pulmonary embolism is greatly diminished, and ligation of the femoral vein is no longer recommended. Treatment aimed at relief of pain and reduction of swelling consists of elevation of the extremity and applications of heat. Guarded exercise of the affected leg is desirable and as soon as the pain and temperature have subsided, an elastic bandage should be applied and the patient gradually made ambulatory. Anticoagulants are indicated in the management of this stage to limit the thrombosis in the affected leg, and to prevent extension of the process to the other leg.

Management of a still later stage when the patient complains of a swollen, heavy, unsightly leg is outlined. Treatment is directed towards reduction of venous stasis and this can be effected by means of elevation of the extremity, muscular exercise, and application of external support.

Peripheral Arteriosclerosis

Complaints arising from this common condition are bringing increasingly larger numbers of patients to the physician. Most patients come because of progressive limitation in the ability to walk, but many seek aid because of rest-pain, ulceration or gangrene of the toes or feet.

The simplest type of case is the patient whose only complaint is that he must stop every block or two because of recurring pain in the calf or foot. Such a patient presents both a general and a local problem; the symptoms in the leg are due to arteriosclerosis which is part of a generalized disease. A careful history and complete physical and laboratory examination may reveal hypertension, diabetes, gout, hypercholesterolemia or obesity which require appropriate therapy. The local problem is relief of pain in the legs which occurs on walking. This can be solved only by measures which increase the circulation in the extremities. Complete abstinence from smoking is urged for such patients.

The commonest error in the management of patients with this disease is to advise them to spare their legs and walk as little as possible. Because active use of the muscle increases its blood supply it is the author's custom to recommend graded activity of many kinds to patients with intermittent claudication. They are particularly encouraged to walk at a leisurely pace from one to three miles daily, stopping briefly when necessary to relieve pain.

Heat, both general and local, is of value. General heating of the body causes peripheral vasodilatation, thus bringing more blood to the extremities. Local heat increases the metabolic activity of cells so that increased amounts of the vasodilators, lactic acid and histamine, are released in the tissues. The simplest, safest and cheapest manner of supplying both local and general heat therapy is the warm tub bath. This should be taken at body temperature for one-half to one hour once or twice a day; skin irritation is lessened by the addition of a pound of epsom or sea salt to each bath. Dry heat applied with a baking apparatus or by diathermy is also helpful, but care must be used to avoid over heating. A temperature between 90 deg. and 95 deg. F. maintained for several hours is an effective and safe form of treatment. This can best be given at night

by means of a specially constructed heater regulated by a thermostat.

The value of drugs in treatment of this form of vascular disease has not been established. Common vasodilators, some of them expensive, are disappointing; likewise are many types of costly apparatus using principles of the suction-pressure glass boot.

An optimistic attitude on the part of the physician is justified and it encourages the patient. Nature is on the side of the doctor and considerable spontaneous improvement may occur. Collateral circulation develops in many patients and with the simple measures outlined, improvement may be expected in a surprisingly large number of cases.

If ulceration or gangrene occurs the patient should be confined to bed; the head of the bed should be elevated to aid the flow of blood to the extremities. Aspirin, codeine or morphine may be necessary for the relief of pain. Sometimes small intravenous injections of typhoid vaccine to produce slight febrile reactions will provide relief. Local heat frequently aggravates pain and it should then be discontinued. Effect of cooling with covered ice bags may be tried.

The diabetic patient with advanced peripheral arteriosclerosis presents a special problem because of his susceptibility to infection. Because of this, any local ulcerative or gangrenous lesion should be treated seriously: weight-bearing must be forbidden, smoking must be stopped, the diabetes must be carefully controlled, the local lesion must be carefully sterilized and covered with an adequate sterile dressing, and measures to improve the circulation must be instituted. In addition, penicillin should be used locally and by injection. If conservative treatment is not successful amputation should be done before the patient becomes too ill to survive the operation. The author recommends a guillotine amputation through the mid-leg rather than through the mid-thigh.

Thrombo-Angiitis Obliterans

This disease which has been steadily increasing in frequency during the past fifty years, occurs in young individuals, chiefly between twenty and forty years of age. Ninety-nine per cent of the patients are male, but occasionally a typical example occurs in a female. All nationalities and races are affected. The author states: "The use of tobacco by individuals susceptible to this substance causes the disease."

The first symptom may be an attack of superficial phlebitis, or pain in a toe which is mistakenly attributed to an ingrown toenail, or pain in the calf muscles on walking a few blocks. As the disease progresses, ulceration or gangrene may occur.

Since he ascribes the disease to a special susceptibility to tobacco, the author logically states that the most important part of treatment is to make certain that the patient has absolutely stopped smoking. Considerable spontaneous improvement in circulation often results, but to speed up return of blood supply the repeated intravenous injection of hypertonic salt solution is recommended. A 5% solution of sodium chloride is given by fairly rapid intravenous injection (300 cc. in 10 mins.) every other day at first, then later at increasingly longer intervals, until symptoms are relieved. This treatment is ambulatory and does not interfere with employment. Total duration of treatment varies from six weeks to two years. The author has treated over 900 patients in the past 23 years with these injections and over 800 have improved so that in the great majority treatment is no longer necessary.

In patients with ulceration or gangrene, bed rest and codeine or morphine for relief of pain are required. Repeated intravenous injections of typhoid vaccine may be helpful. In some cases section of sensory nerves of the foot is necessary to relieve pain while ulcerated areas are healing. If amputation is needed it should be done below the knee.

Comment

Arterial Embolism

This condition is one of the two common causes of sudden arterial occlusion. The other is thrombosis. Embolism and thrombosis are about equal in frequency as a cause of sudden arterial obstruction and unfortunately there are no certain methods of distinguishing between them. However, when disease of the heart is present, particularly if associated with fibrillation, sudden occlusion of an artery can usually be attributed to an embolus from the heart. When sudden arterial occlusion occurs in the presence of peripheral arteriosclerosis obliterans or thrombo-angiitis obliterans, it can be attributed to thrombosis occurring as part of these diseases. Fortunately, the determination of the exact cause is secondary to rational treatment of the diminished blood supply resulting from occlusion.

Dr. Silbert has indicated the importance of early diagnosis in arterial embolism. It should be emphasized that at the Mayo Clinic it has been found that only 50% of cases of sudden arterial occlusion present a typical clinical picture at onset; (i.e. abrupt severe pain in a limb); in the others, symptoms may be minimal or bizarre (numbness, coldness, tingling, or weakness). Thus, any symptom in a limb occurring in a patient confined to bed for any reason demands careful examination of the vascular supply to that extremity. The most common condition to be dis-

tinguished from sudden arterial occlusion is acute thrombophlebitis. As a rule, the normal limb temperature, edema, distended veins and normal arterial pulsations usually encountered in cases of thrombophlebitis serve as an adequate contrast to the coldness, collapsed veins, and reduced or absent pulsations in the arteries in cases of sudden arterial occlusion.

Treatment of sudden arterial occlusion was outlined in the Man. Med. Review of June, 1947 (p. 354). As in the article abstracted here, the harmful effects of elevation of the limb and application of heat were indicated. The regime recommended by the peripheral vascular section at the Mayo Clinic is as follows:

(1) Opiates as required for pain.

(2) Papaverine, gr. ½ to gr. ¾, injected into the artery proximal to the site of the occlusion. If the first injection does not improve circulation it is questionable whether further trial with the drug will be of use. However, if improvement does occur, the injection should be repeated whenever evidence of failing circulation in the limb is present.

(3) Alcoholic beverages to promote vasodilatation.

(4) The extremity should be loosely wrapped in cotton to preserve its natural warmth, and the limb placed in a dependent position. The patient should be placed in a warm room (85° to 92° F.).

(5) Simultaneous administration of oral dicumarol and intravenous heparin. Heparin, 50 mgms. is given intravenously, every four hours (for 24-48 hours) until the prothrombin time has been prolonged by the dicumarol; the elevated prothrombin time is then maintained by the use of dicumarol alone. The initial dose of dicumarol is usually 300 mgms. with a second 200 mgms. 24 hours later; subsequent dosage depends upon the results of the prothrombin time determined daily. Anticoagulants should be continued for 7 to 10 days following successful medical treatment or embolectomy, but where treatment has been unsuccessful they should be stopped when gangrene seems inevitable.

Rationale for the use of anticoagulants in sudden arterial occlusion is as follows: in cases of embolism anticoagulants prevent thrombosis occurring in the collateral arteries which are in intense spasm; in cases of thrombosis, they prevent extension of the process.

With the use of this routine embolectomy is rarely necessary but it is advised if no improvement occurs after 3 to 4 hours of medical treatment.

Phlebitis

The most common and important form of phlebitis is thrombo-phlebitis of the deep veins of the lower extremity occurring after operation, injury or confinement, and discussion will be limited to this. Dr. Silbert properly emphasizes the importance of guarding against its occurrence whenever a patient is put to bed for several days for any reason.

Since the abstracted paper was written, there has been a further shift away from surgical ligation in the treatment of this condition. The excellent results reported by various authors using anticoagulant therapy is resulting in widespread adoption of this treatment. At the Mayo Clinic, in over 1,000 cases dicumarol has been effective in preventing thrombosis in veins, extension of existing thrombosis and pulmonary embolism. In cases of post-operative thrombophlebitis and post-operative pulmonary embolism with and without thrombophlebitis, recurrence of thrombosis, thrombophlebitis or embolism has been reduced to almost none, and no fatal embolisms have been encountered if dicumarol was given. The disadvantages of ligation, as indicated in Dr. Silbert's paper, plus the accumulating evidence of the efficiency of anticoagulants, suggests that ligation should only be done where anticoagulants are contraindicated or facilities for their controlled use are unavailable.

Medical management of the ordinary case of deep thrombophlebitis may be summarized as follows:

(1) Bed rest with the affected limb or limbs elevated at an angle of 30° until four days after the edema and swelling have gone down, the oral temperature has become normal, and tenderness along the affected veins has disappeared completely. This takes from 10 to 18 days; at the end of this time the patient is allowed out of bed. If edema then develops an elastic support should be used for a few weeks. Movement in bed of the affected limb may be started on the third day.

(2) Hot moist compresses should be applied from the ankle to the groin until all tenderness is gone from the affected vein.

(3) Anticoagulant therapy, as previously described, should be continued until the patient has been ambulatory for two or three days. Thus the period of administration may vary from one to eight weeks.

Peripheral Arteriosclerosis

The type of arteriosclerosis which occurs typically in the extremities and which results in gradual or sudden arterial occlusion is best called arteriosclerosis obliterans. It occurs most commonly after the age of fifty and is encountered six times more often in males and eleven times more often in diabetics. The examination of every patient, but particularly in the elderly, should include palpation of the peripheral arteries,

because impaired arterial pulsation is the most consistent finding in the disease.

In addition to the points brought out in the abstracted paper, it is well to remember the great importance of proper care of the feet in these patients. Each one should be given detailed instructions concerning the prevention of any mechanical, chemical or thermal injury to the skin of the feet or toes.

Thrombo-Angiitis Obliterans
(Buerger's Disease)

Dr. Silbert has long been one of the proponents of the concept that tobacco is the immediate cause of this disease. There is general agreement that the use of tobacco, because of the vasoconstriction it produces, exerts a deleterious effect on patients who have the disease. However, many authorities do not feel that tobacco is more than an important contributing factor. Be that as it may, all patients with the disease should stop smoking completely and permanently.

There are many treatments used for this disease depending partly on its stage and severity, and partly on the type of person with the disease. Among the therapies about which there is no general agreement is the intravenous administration of hypertonic solution of sodium chloride as recommended by Dr. Silbert and others. Improvement in his cases may be due to coincident cessation of smoking for the six weeks or so during which the saline is given. Experience with this treatment at the Mayo Clinic has been disappointting, and thrombosis of veins at the site of injection may become a problem.

Sympathectomy is a valuable procedure in many cases.

Reference for Comments

Allen, E. V., Barker, N. W. and Hines, E. A., Jr.: Peripheral Vascular Diseases. Philadelphia, W. B. Saunders Co., 1946.

MEDICINE

Some Hematological Aids in Differential Diagnosis

P. T. Green. B.A.. M.D.

The hematologist is in an unique position, as he dips into the blood stream to study the passing cytological parade. Since a surprisingly large number of disease processes do affect the blood, the hematologist can contribute much to the differential diagnosis of disease processes. As the cellular responses of the body are reflected in the blood, he is able to gauge the type of armament that is being mobilized to combat the particular threat which is menacing the organism and estimate the nature of the attack.

At the outset, therefore, it can be said that hematology can often produce evidence that disease is present, and this is invaluable when doubt about this point exists. Abnormal blood findings indicate that some pathological process is present and active. In order to derive the maximum benefit from blood studies a sound knowledge of normal variation and careful technique are imperative.

Example: A 28-year-old soldier was repatriated because of complaints of vague dyspepsia, backache, tiredness, weakness, which were thought to be psychoneurotic in origin. On arriving at hospital, physical examination was negative except for some muscle spasm in his back muscles. Prolonged investigation, including Barium series, and x-rays of his vertebrae did not disclose any disease. Finally blood examination showed that there was a moderate anemia, with presence of immature white and red cells. This pointed to an irritative bone marrow lesion, and an occult malignancy was therefore postulated. Shortly afterwards post-mortem disclosed a carcinoma of the tail of the pancreas, with widespread bone marrow metastases, even though the x-ray disclosed no evidence of this.

Hemoglobin

Estimation of the hemoglobin is the commonest hematological procedure, and unfortunately it is too often merely an estimation. With more accurate methods now available, such as a properly calibrated photoelectric colorimeter, a much sharper line can be drawn between the normal and abnormal. Among 250 normal males we have found that the lowest hemoglobin was 90%. Murray found the lowest hemoglobin in his group to be 95%. [1]Another investigator has claimed that the lowest limit for normal in a male is 14 gms % [2](approximately 90% in this region). It therefore follows that a hemoglobin below 90% in a male is a significant abnormality— that is below 90% of the normal for the region, and determined by a fairly accurate method of estimation. It has been difficult to make this point appreciated, and one still hears 80% being considered normal, when it is not.

The determination of normal for females is not quite so easy, because of physiological variations due to cyclic bleeding and pregnancy. In one series it was found[3] that 80% of college women had hemoglobins over 92%, and it seems likely that anything below 85% is abnormal.

When a subnormal hemoglobin is found, "anemia" can be said to be present. In considering the anemias it should be unnecessary to point out that the term "anemia" is no more a diagnosis than is the term "fever." Also "secondary anemia" is not a diagnosis unless one can answer the question "secondary to what?"

When anemia is detected it becomes imperative to determine what type of anemia is present. Routine methods classify the anemias into macrocytic, normocytic and microcytic. It is not proposed to spend much time discussing this further, except to take a microcytic anemia as an example.

This type of anemia. is an iron deficiency anemia. It means that iron deficiency exists in the individual, and as the body carefully husbands its stores of iron, it signifies that more iron is being lost from the body than is being absorbed from the diet. This occurs almost exclusively in chronic bleeding and grossly deficient diet. It is commonest in the adult female.

Iron deficiency anemia in the male almost always means chronic hemorrhage from the gastrointestinal tract, and to treat him with iron without further investigation is almost unforgivable. It means that the opportunity for early diagnosis has been passed up. Too often these patients are treated with iron until the primary cause of the iron deficiency has become hopelessly advanced.

Example: Male, 55, with a two-year history of weakness and tiredness and occasional bouts of crampy abdominal pain and vomiting. An "anemia" had been diagnosed by two of the three doctors he had previously consulted, and he had been treated with liver and iron, etc., with some response. He had on admission, 55% hemoglobin, and 4.5 million red cells. Color index was 0.6. Two barium series and enemas were negative. Stools were persistently positive for occult blood. It was only with the third barium enema that a carcinoma of the ascending colon was demonstrated, and dispite the long history it was still ressectable. After operation his hemoglobin returned to 100%.

Other forms of anemia offer clues just as valuable, and if followed through will generally lead to the diagnosis of the underlying disease.

White Cell Count

This is probably the second commonest procedure used. The surgeon in particular orders this frequently when confronted with the "acute abdomen." Of all the procedures it probably yields the least information by itself. The surgeon himself does not put much store by it, and probably the best evidence for this is the frequency with which the technician must go to the operating room in order to give him the result.

While 95% of normal people have counts between 4.5 and 11.5 thousand, 3% have counts as high as 15.0 thousand some time during the day. Localized infections tend to produce higher counts than generalized ones by the same organism: for example, tuberculous meningitis is often associated with a leucocytosis, whereas miliary tuberculosis is often associated with a leucopenia.

The total white count by itself furnishes so little information, that it probably should always be done in conjunction with a differential count.

Blood Smear and Differential

If only one procedure in examination of the blood were allowed this would be the procedure of choice, because one can often guess the total white count, and even estimate the hemoglobin from the smear. Naturally, this is not a recommended practice. A poor smear is worse than nothing at all.

Differential counts are subject to considerable error, according to laws of probability, but a smear that is made properly and has two hundred cells counted has a minimum of error. It should be pointed out that in smears which are made thick and slowly the polymporphs tend to collect at the edges and the ends whereas the lymphocytes stay in the middle, so that if only one part of the smear is covered in the count incredibly bad differentials can be discovered. For example in one normal smear made in this way, a count around the edge disclosed 84% polys., an abnormal figure, whereas a count in the centre of the smear showed 64% lymphocytes! A good technician knows this pitfall and avoids it.

Polymorphs

There is a general law that says "No disease which runs its course with a neutrophile leucocytosis is followed by lasting immunity," and it has a corollary—"A disease whose course is characterized by a lymphocytosis is followed by lasting immunity." From the nature of acute surgical emergencies, then, one can say that the finding of a lymphocytosis almost eliminates the surgeon from the field of action, at least in adults, even though the total white count is increased.

When there is peritoneal inflammation, blood changes begin to appear within an hour and these changes show up in the differential. Naegeli said that he had never seen a case of acute appendicitis with a normal differential.

With pyogenic infections a definite sequence of events occurs. The eosinophiles disappear promptly and the basophiles as well. The bone marrow begins to release its white cells and a shift left is found early in the process. Lymphocytes and monocytes decrease and the marrow loses its ability to properly utilize iron to form hemoglobin. Eosino-

philes may reappear when some complicating factor is developing, and this occasionally happens in lobar pneumonia with the appearance of an empyema, or in acute appendicitis when the appendix has ruptured and contaminated the peritoneum. The eosinophiles usually disappear again shortly.

With convalescence from infection, a regular sequence of events also occurs. As the infection subsides there is a decrease in the number of immature polymorphs. and a marked, even if transitory rise in the monocytes. The polymorph. immature count then becomes normal and a marked rise in lymphocytes, often above 40% occurs. At this stage, too, variable eosinophilia appears.

Complete recovery is characterized by a return of the differential to normal levels[4].

The total number of polymorphs. depends on two factors:

1. The rate at which they are being produced and liberated from the marrow.

2. The rate at which they are disappearing from the blood.

Thus, when a total white count of 6,000 is found, but the total polymorphs form 85% it can be assumed that pus is forming somewhere, and this is often a valuable diagnostic clue.

In addition to the relative and absolute numbers of mature and immature polymorphs. their appearance can offer clues in differential diagnosis. The finding of well defined toxic degeneration in these cells, which is described in most textbooks of hematology, is practically pathognomonic of pyogenic infection. These changes usually do not become marked until the infection has been active for forty-eight hours, and disappears a few days after the crisis is past. It is always a feature of pneumococcal Pneumonia, and is also found in Meningococcal Septicemia, and Peritonitis. The finding of a low white count, with much toxic degeneration is a bad prognostic sign.

Example: 60-year-old male admitted comatose, having been found in this condition in his boarding-house room. A blood examination disclosed a total white count of 4.0, almost all of which were polymorphs. with many immature forms present, and all showing marked toxic degeneration. From the smear alone it was guessed that the case was a lobar pneumonia and that he would shortly die. He died a few hours after admission, and autopsy disclosed a classical lobar pneumonia.

Pyknotic nuclei are encountered in the polys where there is considerable dehydration and acidosis, and the appearance of these cells in diabetic acidosis suggests such a diagnosis.

The large, lazy-looking hypersegmented polymorphs seen in pernicious anemia are, perhaps, even more characteristic than are the red cells.

A polynucleosis (that is an increased percentage of polys with or without leucocytosis) in the absence of fever is very suggestive of malignant disease, and in a case of malignancy progressive increase in the white count and polymorph percentage is usually evidence of rapid spread and/or metastasis of a carcinoma.

Eosinophilia in malignancy, in the absence of other obvious cause may indicate the presence of bone metastases.

Lymphocytes

These cells may be absolutely or relatively increased in number. A leucopenia with relative or absolute lymphocytosis suggests that the disease present is not pyogenic, but is probably a virus infection. Some other diseases do give a somewhat similar picture—eg. brucellosis, disseminated lupus erythematosis. It is important to be certain that the small round cells seen are lymphocytes, as those unfamiliar with cytology may call all small round cells lymphocytes, when in reality cells seen are primitive cells such as myeloblasts.

The abnormal cells seen in infectious mononucleosis are usually characteristic enough to make the diagnosis.

A high lymphocytosis with normal sedimentation rate and a cough is a triad that can be almost nothing else but pertussis.

Leucopenia with abnormal lymphocytes of the plasma cell type are very suggestive of rubella, and the diagnosis can be made before the eruption occurs. Leucopenia is often marked here. A less marked picture is seen in rubeola, mumps, chickenpox and rarely in the so called plasma-cell leucemia.

Lymphocytosis is also seen in other diseases, such as Addison's disease, and hyperthyroidism.

It is a finding that almost rules out malignant disease, except for lymphosarcoma.

In interpreting the finding of lymphocytosis, one must not forget about the post infectious lymphocytosis mentioned above. A smear taken during this phase of a pyogenic infection might confound the unwary.

Eosinophiles

The absence of eosinophiles suggests the presence of acute pyogenic infection. The significance of eosinophilia (over 10%) in allergic and parasitic diseases is too well known to bear discussion here. However a high eosinophilia in the presence of fever is something that is not seen very often. In tuberculosis the appearance of increased numbers of eosinophiles means that some change is occurring in the patient, either for better or worse,

and further observation is required to determine what is happening. However, in tuberculosis one rarely finds eosinophiles when the temperature is above 102. In rheumatic fever some claim to find eosinophiles with the fever, but others deny this. Usually they are seen as the fever is subsiding.

The diseases in which a high eosinophilia is found with high fever are scarlet fever, trichiniasis, and periarteritis nodosa.

Basophiles

Like the eosinophiles, these disappear promptly with the onset of pyogenic infection. They are seen in large numbers only in chronic myelgenous, leucemia and in polycythemia vera.

Immature White and Red Cells

This so called leucoerythroblastic picture is uncommon apart from the leucemias, and hemolytic crises. It occurs in some rare diseases such as agnogenic myeloid metaplasia. This finding in the presence of only a mild anemia, or in the absence of splenomegaly is strongly suggestive of bone marrow metastasis. During the past year seven cases of this picture were encountered. Five were associated with carcinomatosis: one pancreas, three prostate, and one stomach: One was an acute myeloblastic leucemia with chloromatous tumors found in the marrow, and one was an elderly male with congestive failure, liver cirrhosis, and embolic occlusion of his popliteal artery. Breast is another common primary. It is seen that the prognosis is very poor when this picture is discovered.

Macrophages

Occasionally one encounters macrophages in the peripheral blood, in considerable numbers. They tend to appear when there is a marked monocytosis, as in monocytic leucemia. They are seen infrequently in tuberculosis, malaria and typhoid fever. In the absence of monocytosis the picture is almost pathognomonic of septicemia and almost always the septicemia is associated with subacute bacterial endocarditis. They are seen particularly in smears made from the ear lobule. For some unknown reason this picture is also seen in about 20% of cases of dementia paralytica.

Monocytes

These tend to appear in showers in the blood stream. They are seen in post infectious states, tuberculosis and malaria, and apart from monocytic leucemia, in few other conditions are they found in large numbers. It is said that in the presence of liver disease their granules are much coarser than normally.

Red Cells

Of course, in searching a smear one also looks at the red cells and notes their characteristics such as sickling, ovalocytosis, spherocytosis, target cells, basophilic stippling, malaria parasites, etc., etc., and also the appearance of the platelets. However, it is not proposed to say much about the differential value of these findings. Perhaps, in conclusion, a word should be said on sternal marrow aspiration. These smears showing, as they do, the state of the source of most of the blood cells gives very valuable information, both of a positive and negative value. Occasionally in an obscure case, entirely unsuspected pathology may be turned up. Multiple myeloma may be diagnosed by this method a year before the x-ray discloses any evident bone changes. Gaucher's disease, metastatic carcinoma and other states may be uncovered by this procedure. Its greater value, however, is often to prove or eliminate leucemia from the differential. As further studies are made on the characteristics of the marrow under different pathological conditions greater diagnostic aid may arise from this procedure. It is certainly indicated in any obscure blood dyscrasia.

Conclusion

The purpose of this paper has been to demonstrate that simple hematological procedures may be of considerable aid in differential diagnosis. Completeness has not been intended, but merely illustrative cases to demonstrate various ways in which the hematologist may help in arriving at a more accurate labelling of disease.

References

1. J. Path. & Bact. 42: 67.
2. J. Lab. Clin. Med. 31: 886.
3. C.M.A.J. 51: 351.
4. Am. J. Med. Sc. 184: 167.

Report of Canadian Medical Association Meeting

Round Table Discussion on "Bulbar Poliomyelitis"

Held in Winnipeg, June 25, 1947, at Annual Meeting of Canadian Medical Association

Participants: Dr. Alan Ross, Montreal; Dr. A. B. Baker, Minneapolis; Dr. R. E. Priest, Minneapolis; Dr. Robert Black, Winnipeg; Dr. Harry Medovy, Winnipeg (chairman).

In opening the Round-Table, the chairman referred to the obvious importance of reviewing the advance in medical knowledge which followed the accumulated experience of epidemics in large centres such as Minneapolis and Montreal. In Minneapolis, over 2,000 cases of Poliomyelitis had been treated in the summer of 1946 and some 400 of these had been of the bulbar type.

Dr. Ross referred to some of the known facts about the spread of the disease. There were still a great many gaps in our knowledge of the spread of poliomyelitis. It is accepted that the intestinal tract and the nervous system are predominantly attacked. Spread may occur either through the medium of pharyngeal secretions or stools in both of which virus has been found in large quantities in clinical cases of the disease. It is felt by Sabin that the virus found in the stools actually plays the dominant role in the spread of the disease. In any epidemic the vast majority of the population is probably infected, but only a small proportion develop clinical illness and comparatively few develop signs and symptoms which lead to a diagnosis of poliomyelitis. Immunity following an attack of poliomyelitis is probably considerable, although cases have been reported of authentic recurrence of the disease several years after an initial attack.

Dr. Baker then reviewed the Minneapolis epidemic of 1946 with particular reference to the bulbar cases. He felt that these cases could be classified as follows:

1. Bulbar-Cranial Nerve Nuclei Group

(a) Upper cranial nerve group—this includes cases showing involvement of 5th, 6th, 7th, 8th and the ocular nerves. The cases in which this nerve group alone was affected did well although some patients were left with troublesome residua.

(b) Lower cranial nerve group—10th, 11th and 12th. In this group there is interference with the mechanism of swallowing and a tendency to pooling of saliva and food in the pharynx. There may also be impairment of the action of the vocal cords with stridor or else abductor paralysis and approximation of the cords in the mid-line.

2. Bulbar-Central Autonomic Group

Involvement of the vital centres may occur without involvement of the cranial nuclei.

(a) Bulbar-respiratory centre group — respiration becomes shallow and irregular. There may be periods of apnoea. The intercostals and diaphragm may be completely unaffected. The prognosis is usually serious.

(b) Bulbar-circulatory centre group — lips are cherry red and the skin has a flushed appearance. The pulse is very rapid (150-200) and often irregular. The pulse pressure is small—often 10 mms. of mercury. The skin is cold and clammy. Dr. Baker showed a slide of an autopsy specimen of the brain demonstrating bilateral inflammatory necrosis in an area just below the floor of the fourth ventricle.

3. Bulbar-Encephalitic Group

Encephalitic symptoms are often seen in patients with bulbar poliomyelitis.

(a) Diffuse encephalitic group — great anxiety and apprehension. Minimal stimuli produce maximal response. There is often tremor of the hands. There is general hyperactivity. The patients are often confused and difficult to manage. There is often insomnia and in children there may be somnolence.

Dr. Baker stressed the point that in many instances encephalitic symptoms were evidently due to inadequate oxygenation of the cerebral hemispheres since the cerebral symptoms would disappear if measures were taken to ensure adequate oxygenation. This often meant tracheotomy, and administration of oxygen under positive pressure by mask or tracheotomy. Deficient oxygenation in poliomyelitis may be caused by obstruction of the airway by secretions or cord paralysis, by failure of the respiratory or circulatory mechanism (see above) or by pulmonary oedema. When encephalitic symptoms appear it is important to make sure the patient is adequately oxygenated. A most valuable instrument is the oxymeter, which detects hypoxia long before we can detect it clinically.

(b) Focal encephalitic group—This group was rarely observed in the Minneapolis epidemic. Aphasia, myoclonic spasm, grand mal, convulsions, make up the usual clinical pattern.

4. Combined Bulbo-Cercivothoracic Group

Involvement of diaphragm and respiratory muscles featured this group and the respirator was

---

Editor's Note:

In view of the present epidemic of poliomyelitis, we thought that it would be highly timely to publish the following round table discussion. Dr. Harry Medovy, who led the discussion as chairman, has summarized the proceedings in this article.

particularly useful in this series. There were a considerable number of patients in this group. The outlook in adults was very bad; in children, the prognosis was less serious.

Dr. Baker went on to stress the importance of adequate cerebral oxygenation in all bulbar cases. Oxymetry and close clinical observation to detect the onset of hypoxia were extremely important to the patient's survival. Early tracheotomy was in many instances life saving, not only by overcoming actual obstruction, but by making it possible to administer oxygen at regulated levels, even in the respirator.

Dr. Priest then reviewed the experience with tracheotomy in bulbar poliomyelitis. The Minneapolis outbreak was the first in which tracheotomy had been widely used. Dr. Priest's questions and answers are reprinted herewith:

Addendum

Q. Will you tell us briefly what experience you have had with tracheotomy in bulbar poliomyelitis in Minneapolis?

A. In the 1946 epidemic 1,830 cases of polio were treated in Minneapolis. 400 of these were diagnosed as bulbar. Tracheotomies were performed in 75.

Q. What were your criteria for making the diagnosis of bulbar poliomyelitis?

A. Patients were classed as bulbar when pharyngeal and laryngeal nerve supply was involved and when circulatory and respiratory centres were failing. In some patients spinal components were also present.

Q. Had tracheotomy been used in the treatment of bulbar poliomyelitis prior to its use in Minneapolis in 1946?

A. Yes, tracheotomy had been used in bulbar poliomyelitis in other places before it was used in Minneapolis in 1946. No large series of cases had previously been reported. Most of the reports included two or three cases.

Q. What were your criteria for performing tracheotomy?

A. On the adult neurology service at the University Hospitals tracheotomy was done in any polio patient whose bulbar symptoms were early and progressive or who had involvement of circulatory or respiratory centres.

On the University pediatrics service and at the Minneapolis General Hospital patients who could not clear their own airways of secretion were operated. Inability of the patient to clear his own airway was indicated by recurrence of cyanosis, coarse bubbling rales, laryngeal stridor and inefficient cough. Excited and unmanageable or stuporous patients were operated earlier than patients whose sensoria were clear.

As the epidemic progressed we became more and more convinced that early tracheotomy was the safest procedure.

Q. Does the use of the respirator contra-indicate tracheotomy?

A. No. As as matter of fact tracheotomy is probably a life-saving procedure in respirator cases because it permits aspiration of tracheal secretions which would otherwise be sucked down into lower most portions of the tracheobronchial tree.

Q. What do you expect to accomplish by tracheotomy?

A. The most important single result of tracheotomy is the improvement of oxygen supply to the body. The tissue of the central nervous system is most susceptible to oxygen deficiencies. The tissue of the central nervous system of the poliomyelitis patient has already been damaged by the disease and is even more sensitive to oxygen deficit than is normal tissue. The primary purpose of tracheotomy is to insure proper and constant oxygen supply. Many symptoms of brain damage in poliomyelitis are not actually caused by the action of the polio virus on the central nervous system but are symptoms of anoxia.

In early anoxia combativeness resembling that of acute alcoholism may be present. Other symptoms include confusion, disorientation, irrationality and coma. Failure to recognize anoxia as a possible cause of these symptoms and assumption that the poliomyelitis per se is the cause may misdirect therapy. The administration of sedatives to such patients can be dangerous. Efforts to insure adequate oxygenation often produce great improvement.

Q. How can you tell whether a patient is properly oxygenated?

A. The usual clinical signs of anoxia occur when the patient is actually very deficient in oxygen. At the University Hospitals an apparatus called an oxymeter was used to determine the degree of oxygenation of the blood. This apparatus consisted of photo-electric cells attached to the ear lobe and connected with various electrical apparatus which permitted a direct reading of oxygen tension in the blood at any time. The apparatus in effect was a colorimeter acting on the circulating blood. Such an apparatus is of great value but is of prohibitive cost for general use. However, its use serves to emphasize that the usual clinical sign of cyanosis occurs very late. For practical purposes in treating poliomyelitis one learns that he cannot wait for the patient to become cyanotic before he does his tracheotomy.

Q. What results did you get from tracheotomy?

A. (Show slide with numerical data). Data are summarized in this slide. 75 patients were operated. 29 survived. 17 were classed as having

lived because of tracheotomy. 2 probably lived because of tracheotomy and in 10 early tracheotomy was done. Obviously some of this group would have lived without tracheotomy and some would have died.

In discussing the results of tracheotomy one must bear in mind that he is dealing with that group of polio patients who would almost certainly die if they were left untreated.

Q. What was your technique of tracheotomy?

A. All the tracheotomies both at the University and Minneapolis General Hospitals were performed by the resident physicians in training there. They used a midline incision dissecting down to the trachea and making the tracheotomy opening through the second or third cartilagenous ring. In most cases a "button" of cartilage was removed before the tracheotomy tube was inserted.

Q. What were the complications of tracheotomy?

A. We've felt that tracheotomy caused no death. Complications included mediastinal and subcutaneous emphysema and tracheitis. In 29 patients 27 were decannulated. 2 still wear tubes. One is an adult who may be psychologically dependent on her tube and the other is a child of three years who has residual laryngeal paralysis and cannot breathe because of prolapse of the cords with respiratory obstruction on inspiration.

Q. Would you care to make any final summary?

A. On a basis of our experience we believe that tracheotomy improves the chance for survival of properly selected poliomyelitis patients if done before anoxia has produced significant central nervous damage. We believe further that tracheotomy used in conjunction with mechanical respiratory devices will enable some critically ill poliomyelitis patients to survive until natural recovery of damaged neural tissue can occur.

Dr. Robert Black discussed the problem of tonsillectomy and poliomyelitis. He felt the available evidence was such that one was not justified in carrying out an elective procedure such as a tonsillectomy during periods in which poliomyelitis was epidemic.

The problem of hospital care of poliomyelitis cases was discussed by all. the speakers. In general, it was felt that polio cases should be treated in wards set aside for that purpose, and that typhoid technique should be used on stools of poliomyelitis cases for a period of at least two weeks. In Minneapolis, in spite of the great emergency and the use of some inexperienced personnel, there had been only one case of poliomyelitis among nurses, internes, ward maids, or technicians; this case occurred in an operating room nurse who had no contact with poliomyelitis cases and who was, in fact, on holidays when she became ill.

H. M.

Modern Medicine Methods Benefit to Industry

Speaking before the Canadian Medical Association here last night, Dr. K. E. Dowd, chief medical officer for Canadian National Railways and Trans-Canada Air Lines revealed that in the interests of the travelling public and the health of employees his clinics made 43,000 physical examinations yearly.

Industrial medicine was now a well-established feature of both companies, he said, and the confidence of more than 100,000 employees had been completely won over. He stated the work had paid such dividends that four travelling medical cars had been placed on the rail lines to examine employees at remoter points.

The medical officer revealed sanitary officers of the company were constantly at work checking such facilities as trains, restaurants, stations, hotels, commissary stores and camps. This type of work had been intensified since the war with the addition of many ex-servicemen who were all connected with sanitary units in the war theatres.

"Our transportation systems today are operated by a force of men and women highly trained and physically sound, and behind them is an efficient medical department guarding their welfare and that of the company and its clients," Dr. Dowd said in concluding a close-reasoned address which stressed the benefits of industrial medicine in modern society.—From: Canadian National Railways Press Bureau.

ANURIA

Round Table Urological Conference

June 26th, 1947

Dr. H. Morse, Winnipeg, Chairman

Dr. J. McLelland (Toronto), enumerated the causes of Anuria as follows:

1. Sulfa drugs by:
   (2) Mechanical blockage of kidney pelvis or ureter by crystals.
   (b) Intoxication (?) or Nephrosis (?). Autopsies showed no tubular collection of crystals. There was a variable pathological picture in the kidney.
2. Transfusion Reactions.
3. Hemolysis in the blood after transurethral prostatic resections—due to the irrigant solution getting into the blood through the prostatic veins. Pathology was localized round celled infiltration in the glomeruli. He stressed a careful selection of the irrigating fluid and a low head of pressure.
4. Crush injuries—a "histamine-like substance" acting on the kidneys. Treat with intravenous Na HCO_3.

5. Drugs—Tr Opii was cited.
6. Reflex anuria—unknown cause.
7. Low blood pressure following shock.

Treatment of Anuria

1. Fluids—large amount with glucose in first 3-4 days.
2. Drugs—Caffeine Sodium Benzoate, Aminophyllin.
3. Short wave therapy—to alternate kidneys one hour at a time.
4. Artificial Kidney—Dr. Gordon Murray's operation and apparatus able to withdraw 2-2.5 gms. nitrogenous waste per hour.
5. Renal Decapsulation—value not proved.

Dr. J. Doupe (Winnipeg) outlined the physiology of urinary secretion.

Dr. D. Nicholson (Winnipeg) discussed certain pathological findings, general and locally to the G.U. Tract, applying them clinically—stressing:

1. Assessment of pre-existing cardio-vascular-renal conditions. Cardiac failure in a hypertensive, or secondary shock, or severe haemorrhage, will all reduce systolic blood pressure below a level necessary for renal function.
2. Is blood transfusion valuable enough in the above cases to outweigh
   (a) Effect of increased osmotic pressure.
   (b) Danger of slightly hemolysed blood.
   (c) Danger of minor incompatibility.
3. Kidney Lesions—

(a) Rarely is an arteriosclerotic renal artery a factor in anuria.

(b) Hyperplastic changes in interlobular artery and afferent arteriole are common in hypertension and a fall in pressure more readily produces anuria.

(c) Prostate patients are likely to have such obstructive lesions as endothelial proliferation, hyaline change, fibrosis, in the glomerular tuft and will show it by a poor concentration test.

(d) Tubular lesions are not important. Crystalline or amorphous sediment can obstruct the tubule. Well known sediments doing this are sulfonamide, blood or hematin, or myohemoglobin (crush syndrome) or Bence Jones proteins.

Bichloride selectively destroys the kidney tubule—especially in the distal convoluted part.

He stressed proper care in preparing renal specimens for section or sulfa crystals may be washed out and not found under the microscope.

Dr. Sellers (Toronto) cited present "perfusion of small bowel" experiments with a modified Miller-Abbott tube in an endeavor to create an artificial kidney.

Dr. Braasch (Rochester) quoted Creevey's recent work on resection irrigants, their absorption, and effect on the blood. It has not been proved hemolysis occurs. The reflex nervous system has not been excluded as a factor in these anurias, and there does seem some connection with damage to the bladder.

Dr. C. Code (Rochester) suggested changes in blood other than hemolysis. Trauma to the blood does cause renal changes. Anuria is related to vasoconstriction which may be a factor. The new drug, Tetra ethyl ammonium chloride paralyses the sympathetic ganglia and its use might prevent vasoconstriction. Trauma to bladder, or traumatized prostatic tissue with liberation of some toxin may be a factor in anuria.

De. Legault (Montreal) mentions use of intravenous Novacaine 1%—4-10 cc's slowly once or twice daily followed by 500 cc's of glucose as a therapeutic agent—early in reflex anuria.

Dr. Powell (Montreal) stresses use of B A L as an aid in treating successfully bichloride poisoning.

Dr. Wood (Vancouver) mentions burns as a cause of anuria deaths. Tubular damage found. Dr. Sellers stated there was considerable hemolysis in burn cases.

Dr. Pearse (Toronto) suggests sulfa anuria is due to tubular damage which will recover if patient can be kept alive until epithelium recovers.

Paper—Essential Hematuria

Dr. Mitchell, Toronto

After exhaustive study one finds no clinical or radiological cause of bleeding from one or both kidneys, what is the procedure? This is "Hematuria of undetermined origin."

Exploratory may reveal no surgical pathology. The speaker felt justified in replacing the kidney after negative pyelotomy palpation. Sometimes this or nephrostomy, or decapsulation, or denervation stopped the haemorrhage. Cases with long follow-ups were cited by Drs. Patch and Pearse where such conservative measures have succeeded. Sometimes the other kidney required similar care months later. Dr. McLelland stressed the possibility of missing an early lesion—often neoplastic—even if the kidney were split. Dr. Braasch mentioned bleeding varicosities in the urinary tract.

Paper—Renal Cysts

Dr. Powell, Montreal

Showed an excellent series of renal cysts illustrated by pyelograms.

Paper—Kidney Sarcoma

Dr. Wood, Vancouver

A review of the literature and report of one additional case.

Paper—Wilms Tumours

Dr. Ellis, Edmonton

Reported ten cases—ages varied from one to fifty-three years. Sexes equal. Early symptoms—mass, pain, malaise. None with fever—one with hematuria, one with dysuria. Eight operations—five loin—two transperitoneal. Two refused

therapy. One surgical death, one alive eleven years, one five years and one three years.

Problems

1. Preoperative x-ray therapy.
2. Type of x-ray — fractional or concentrated massive.
3. Type of Incision.

Dr. McLelland and Dr. Bourgeois favoured loin approach. Dr. Pearse the transperitoneal approach.

Dr. Braasch favoured preliminary x-ray therapy if the child could tolerate it. It was often a diagnostic aid versus hydronephrosis. In either type of case the difficulties of pyelographic investigation were obvious.

Round Table Conference, June 27th, 1947

Subject: Antibiotics and Chemotherapy in Urology

Dr. Mitchell, Toronto, on Sulfa Drugs.

In Gonorrhea, Decreased sensitivity of the disease appeared to occur.

In other urinary infections, the small dosage of sulfa to ordinarily sensitive germs seems to be effective yet. This dosage may be tapered off.

Toxicity

First noticeable were hematuria and crystalluria, leading on to oliguria and anuria. He forces fluids and uses no alkaline routinely. A follow up on surviving anurics revealed no apparent renal damage. A new low toxic drug sulfamezathine was mentioned.

Dr. C. M. Spooner (Toronto) on Penicillin

In Gonorrhea, 96% cures; 20% had a residual urethral discharge which was treated by older methods.

In Non-Specific Urethritis, Penicillin was of limited value.

In Pyogenic coccal infections, very effective.

In Perirenal infections, probably effective.

Dr. D. Swartz (Winnipeg) on Streptomycin

He detailed by a slide the sensitive organisms. Very doubtful benefit in Tuberculosis. He stressed the Streptomycin—resistance developing tendencies of various gram-negative Bacilli. High urine alkalinity is required. Eradication of obstructions, calculi, etc., must be carried out. Streptomycin works less effectively in mixed infections. Watch for recurrence of infection as long as a week after urine sterilization. Recommended duration of therapy is one week. Dosage varies with the degree of sensitivity of the germ. This is a quantitative test.

Types of Cases

Poor maintained results in neurogenic bladders or in presence of stones or obstruction. Some value in uretero-intestinal anastomosis pre-and post-operatively. May be useful orally in these latter cases. In G.C. and N.S.U. good response if uncomplicated.

Concluded

Streptomycin has limitations and must be used after careful G.U. study as well as bacteriological surveys for sensitivity.

Paper—Dr. H. S. Good, Regina

One case report of post-operative vesico-vaginal fistula combined with right ureterovaginal fistula. Cured by transvesical operation on bladder fistula plus later Right Nephrectomy.

One case report of imperforate anus and congenital urethrorectal fistula with blind urethra ending at transversus perineus muscle. Satisfactory evacuation and control of stool and urine after combined suprapubic and perineal approach.

Paper—Dr. Hogarth, Fort William

The Urologist and the General Practitioner

A wise and frank discussion of practitioner—specialist (and patient) relationships. It is hoped this paper reaches publication early.

Paper—Dr. Barry, Kingston, Ont.

Bladder Diverticulum

Presentation of a series of bladder diverticula Illustrated Stresses

1. Barium cystograms with full and emptied bladder.
2. Presence of bladder neck obstruction.
3. Possibility of ureter opening into diverticulum.

Paper—Dr. Laroche, St. Hyacinthe

Infected Bilateral Urinary Calculi

Stresses pyuria as a lead to complete urological and radiological investigation.

Sectional Meeting of Psychiatry

Dr. Wendell MacLeod reviewed a group of three hundred (300) patients with digestive tract complaints, unrelated to anatomical lesions. Faulty attitudes towards complaints and the attaching of undue significance to probably unimportant signs such as "visceroptosis" and symptoms such as "belching" may be a cause for undue worry on the patient's part. The normalcy of certain symptoms such as "belching" or passing flatus in certain people should be explained to those suffering from these symptoms. The importance of the early recognition and treatment of somatic pathology, causing psychotic behavior, was stressed by Dr. E. Johnson, of Selkirk. Dr. Trevor Owen, of Toronto, and Dr. G. Stevenson, of London, discussed respectively the treatment of psychosomatic disease by appealing to the patient's reason and intellect, and role of mental hygiene in modifying psychosomatic illness.

Round Table Conference

Dr. T. E. Dancey, of Montreal, told of his experience in the use of sub-shock insulin treatment in cases of "battle fatigue" in otherwise normal fighting men on the continent after "D" Day. A discussion of the value of various types of group psychotherapy in the treatment of Psychoneuroses was led by Dr. Gordon Hutton of Vancouver. He emphasized the need of stressing the assets of the psychoneurotic rather than dwelling at length or even solely on the weaknesses that are the cause of his psychopathology. The present plans to make psychiatric advice available to University students through the Councillors, now active among them, were discussed, but it was generally agreed that too few psychiatrists are now available to provide a really adequate service.

Lecture by Dr. C. B. Farrar

Professor of Psychiatry, University of Toronto

Practitioners were urged to consider psychic, as well as physical factors, in illness and to evaluate the importance of each in every patient. "Don't say there is nothing wrong just because the physical examination is negative. If a man believes he is ill, then he is ill." "If a man believes he is ill when he is not ill, then he is very ill indeed."

Round Table Conference

There was a general discussion of the problem of psychiatric treatment of childhood behavior disorders. A description of the pattern, by which the psychiatric and psychological services in the Winnipeg schools is set up, was given by Dr. Gordon Stephens, the Director of this plan. He told of the use of adjustment teachers for retarded children and the special classes for specific reading, hearing, and learning difficulties. In order to obtain psychiatric aid for these children early in their illness, it is necessary to educate teachers, parents, and school nurses concerning mental hygiene. Dr. Stogdill, the Director of the National Committee for Mental Hygiene, then told of the manner in which his department is endeavoring to increase public awareness of the problem of mental illness by pamphlets, the radio and movies.

Round Table Conference

A discussion of the use of Electro-encephalography in brain injuries and in epilepsy was led by Dr. G. L. Adamson. Dr. Kershman, of Montreal, told of the value of repeated E.E.G.'s in following the recovery from a brain injury and in determining the prognosis. Post-traumatic epilepsy never occurs if the E.E.G. returns to normal after the injury. Interesting and important research into the probem of psychomotor epilepsy was discused by Dr. L. D. Proctor, of Toronto. Persons with episodic Psychoneuroses of various kinds and persons with attacks of psychomotor epilepsy have been found to have a similar Electro-encephalogram, and are similar in their response to Dilantin therapy. These two conditions may, therefore, be closely related causally.

Medico-Historical

On Syckeness and Wedlocke

The sycke (as I sayed) they see to with great affection, and let nothing at al passe concerning either Phisycke or good diete, whereby they may be restored againe to their health. Such as be sicke of incurable diseases they comfort with sitting by them, with talkinge with them, and to be shorte, with all manner of helpes that may be. But yf the disease be not onelye uncurable, but also full of contynyall payne and anguishe: then the priests and the magistrates exhort the man, seinge he is not hable to doo anye dewtye of lyffe, and by overlyvinge his owne deathe is noysome and irkesome to other, and grevous to himselfe: that he wyl determine with himselfe no longer to cheryshe that pestilent and peineful disease. And seinge his lyfe is to him but a tormente, that he wyle not bee unwillinge to dye, but rather take a good hope to him, and either dispatche himselfe out of that payneful lyffe, as out of a prison, or a racke of tormente, or elles suffer himselfe wyllinglye to be rydde oute of it by other. And in so doinge they tell him he shall doo wysely, seing by his deathe, he shall lose no commoditye, but ende his payne. And bycause in that acte he shall followe the counsel of the pryestes, that is to saye, of the interpreters of gooddes wyll and pleasure, they shewe him that he shall do lyke a a godly and virtuous man. They that be thus persuaded, finyshe theire lives willynglye, either with hunger, or elles dye in theire sleape without anye fealing of deathe. But they cause none suche to dye aganyste his wyll, nor they use no lesse dilygence and attendaunce aboute him, belevinge this to be an honorable deathe. Elles he that killeth himself before that the pryestes and the counsel have allowed the cause of his deathe, him as unworthy either to be buryed, or with fier to be consumed, they caste unburied into some stinkinge marrish. The woman is not maried be-

fore she be xviii yeres olde. The man is iiij yeres elder before he marye. If either the man or the woman be proved to have actually offended before theire marriage, with an other, the partye that so hathe trespaced is sharpelye punished. And bothe the offenders be forbidden ever after in al theire lyfe to marrye: oneles the faults be forgeven by the princes pardone. But both the good man and the good wyfe of the house, where that offense was committed, as beinge slacke and neglygent in lokinge to theire chardge, be in daunger of greate reproche and infamye. That offense is so sharpely punyshed, bicause they perceave, that onles they be diligentlye kepte from the libertye of this vice, fewe wyll joyne together in the love of marriage, wherin all the lyfe must be led with one, and also all the griefes and displeasures comming therewith paciently be taken and borne.

Farthermore in chuesing wyfes and husbands they observe earnestly and straytelye a custome, which semed to us very fonde and folyshe. For a sad and an honest matrone sheweth the woman, be she mayde or widdowe, naked to the wower. And likewyse a sage and discrete man exhibyteth the wower naked to the woman. At this custome we laughed, and disalowed it as foolishe. But they on the other part doo greatlye wonder at the follye of al other nations, whyche in byinge a colte, where as a lytle money is in hasarde, be so charye and circumspected, that thoughe he be almoste all bare, yet they wyll not bye hym, oneles the saddel and all the harneies be taken of, leaste under those coveringes be hydde som galle or soore. And yet in chuesing a wyfe, whyche shalbe either pleasure or displeasure to them all theire lyfe after, they be so recheles, that al the resydewe of the womans bodye beinge covered with cloothes, they esteme her scaselye be one handebredeth (for they can se no more but her face), and so to joyne her to them notwithout greate jeoperdye of evel agreinge together, yf any thing in her body afterward should chaunce to offend and myslyke them. For all men be not so wyse, as to have respecte to the vertuous conditions of the partie. And the endowments of the bodye cause the vertues of the minde more to be estemed and regarded: yea even in the marriages of wyse men. Verely so foule deformities maybe hydde under those coveringes, that it maye quite alienate and take awaye the mans mynde from his wyfe, when it shal not be lawful for theire bodies to be saperate agayne. If such deformities happen by any chaunce after the mariage is consummated and finyshed, wel, there is no remedie but patience. Every man muste take his fortune wel a worthe. But it were wel done that a lawe were made wherebye all suche deceytes myghte be eschewed, and advoyded before hande.

And this were they constreyned more earnestlye to looke upon, because they onlye of the nations in that part of the worlde bee contente everye man with one wyfe a piece. And matrymoneie is there never broken, but by death; excepte adulterye breake the bonde, or els the intollerable wayewarde maners of either partye. For if either of them finde themselfe for any such cause greved, they maye by the license of the counsel chaunge and take another.

Calcific Disease of the Aortic Valve

This monograph gives in 111 pages all that is known about this condition. It is not only a review of all the literature but is also an intensive and extensive study of the authors' 200 autopsied cases. Clinical signs and every method of making recognition more easy are given place. Naturally, being pathologists, the authors deal more fully with pathological changes in the heart and vessels. There is an historical introduction which goes back to Valsalva and Vieussens who gave the earliest descriptions. The definite relationship to rheumatic fever is stressed and the authors draw attention to the fact that rheumatic infection may smolder for half a century before its irreparable damage is revealed. The title "Calcific Disease" has been chosen in preference to any other of the many names by which the condition is known. There are 24 photographic illustrations and many useful tables.

Calcific Disease of the Aortic Valves: by Howard T. Karsner and Simon Koletsky, Institute of Pathology, Western Reserve University and the University Hospitals, Cleveland, Ohio.; J. B. Lippincott Company, Montreal.

The American Practitioner

Next month the American Practitioner will begin its second year and now is a good time to get it. It differs from other periodicals in aiming to place every recent but proven advance at the earliest possible disposal of general practitioners. The very rare, the very technical and doubtful are all excluded. The articles do not give the results of recent experiments but summarize experimental and laboratory work that has been successfully applied. The clinical aspect is the one stressed and while the writers are all authorities on their subjects they write for the reading of men in general practice. The whole realm of medicine is included though not every system is covered in every issue. There are certain other most valuable and instructive features. In each issue two or more Massachusetts General Hospital Ward Rounds cases are presented with full discussion and there is also a Clinico-Pathological Conference. In addition there is also a case history given for the readers own solution with the answer given later. The American Practitioner is a very good $11.00 worth.

The American Practitioner, $11.00 per year, J. B. Lippincott Company, Montreal.

EDITORIAL

J. C. Hossack, M.D., C.M. (Man.), Editor

One Good Turn Deserves Another

It is natural for us to give our custom to our friends. They are interested in our welfare and we cannot be indifferent to theirs. Sometimes, however, our indebtedness is not immediately apparent and then we are likely to give our patronage to those who have no particular claim upon us and so place at a disadvantage others who have shown us favour.

The Review is published on the money furnished by our advertisers. We are constantly striving to give you a large and better publication but the size of each issue depends upon the revenue of that month. The number of pages of reading matter you get depends upon the advertisers. In using our journal they are not completely altruistic, yet they are influenced by the fact that they are helping the profession in making the Review possible. They are, however, naturally interested in the sale of their products, and the more they are convinced that the Review helps them the readier are they to help the Review.

Our advertisers cover a wide range of products and services but they have this in common—their products and services are of high standard and their reputations are beyond question. That being so they are entitled to your patronage but they have the additional claim upon you that comes from the fact that to them you owe whatever profit and pleasure the Review affords you.

Seeing that they thus favour us we should reciprocate by giving their products and services the preference whenever possible. Their preparations should be our choice and their representatives should have our ears. The other day I heard of a doctor who thus settles the question of seeing detail men. He has his secretary ask of each whether or not his firm advertises in the Review. If the answer is no he does not see the salesman. It's a good idea. After all why should we give our time and our business to strangers interested only in themselves when we can give them to friends by whom we can be as well served and who have shown an interest in us? One good turn deserves another—will you, for your own sake, bear that in mind when prescribing?

Wanton Wiles

Long ago Sir Walter Scott wrote "Love rules the court, the camp, the grove; and earth below and heaven above; for love is heaven and heaven is love." Likewise it will be appreciated by every doctor that an understanding of the love-life of his patients is very necessary for a proper interpretation of their complaints. That being so it is incumbent upon us to have the fullest possible knowledge of love in all its phases. Recently I acquired a number of facts of which I was previously ignorant. My researches were not deep but they were very illuminating. From them I have attained a better understanding of the wiles of women, of the pit falls that lie in the path of love-lorn youths, and of the rocks upon which so many matrimonial barks are wrecked; the wreckage, incidentally, forming a not inconsiderable part of the practice of all of us.

The other day, in an idle moment, my eye fell upon an open magazine. I saw the picture of a sadly disconsolate young matron and under this was the question, "Why has his love turned cold?" Not being able off-hand to supply the correct answer I read on and discovered, a few lines down, that the girl had not been using the proper douche! Douches, it would seem, are exceedingly important although the connection is not immediately clear. I remember Dr. Ross Mitchell telling the story of a harassed wife who complained that between dishes and douches she was in hot water all the time. But perhaps unwittingly she had thereby held her man.

It would appear from the advertisements I read that the two great obstacles to domestic felicity are fat and smells. At least a very large proportion of the advertisements was given to these. Fat—always referred to as "ugly fat"—is fatal to domestic bliss. But the advertisers extend even to the stoutest the brightest hope of regaining their youthful slimness. There are various ways of doing this. Fat can be exercised away, rubbed away, starved away, drugged away or bathed away. And one advertiser promises a loss of 30 pounds without bathing, without drugging, without starving, without rubbing and without exercising. Unless the reduction is done by mirrors or Christian Science I don't see how it can be accomplished and I'm not going to send $5.00 (plus a few cents postage) to find out. The most reasonable method of all was one that furnished diets of 50 calories per day. That certainly should work.

Now, though fat is bad, smells are worse. Nothing makes such a hash of marriage as being smelly. Strangely enough, according to these advertisements, only the girls are odoriferous. Perhaps men have more sensitive nostrils or the girls are anosmic. Another strange fact is the ignorance of the mephitic of her mephitiveness; invariably she gets the horrible truth from the lips of some

true friend when she seeks the reason for her unpopularity. Jeanie, who has been having a tough time socially goes to dear wise old Aunt Jemima and sobs out her story. Auntie takes the girl to her ample bosom and says tenderly,"Ah hates to tell yo this honey chile but conferentially yo stinks." Jeanie, who is up on her smells, says dramatically, "Then 'tis as I feared! But tell me, Aunt Jemima, have I halitosis, or bromidosis, or U.A.P. or B.O. or F.H.?" To which Aunt Jemima groans out hoarsely "Gal, yo got 'em all." Sad and serious though the case may be, it is far from desperate. The movie magazine is consulted. Half a dozen remedies are found for each obnoxious fault. These, plus a dousing with Chenille No. 99 and Jeanie now, really stinking worse than ever, finds every door open, every swain attentive. With such a course of treatment the most malodorous mephitis mephitica (skunk to you) could mix with the elite even in his angriest moments.

The slim, aromatic maiden is thus taught not only how to hold her man but how to catch him. The catching may, however, require further aid, most of which is mechanical and purchasable. In order to save time, let us imagine that Juliette has equipped herself with the full treatment for the purpose of ensnaring Romeo. For weeks, ever since he met her, Romeo's heart and mind have been full of Juliette. He admires her wealth of lustrous hair, her sparkling eyes, her long eyelashes, her pearly teeth. Little shivers run through him as he contemplates the voluptuous pectoral protuberances which make her look more like a woman than any woman has a right to look. Her slim waist curves deliciously into glutei of exactly the ideal dimensions. Her gastrocnemei and solei form contours that would have ravished Praxiteles Here indeed is a thing of beauty and Romeo dreams of the day when the possessor of all these charms will be his own.

The day comes and, at the end of it, the night. He leads her to the nuptial bower all blushing like the morn. Then comes the denouement, the anticlimax. A touch of soap and water and gone are the ruby lips, the rosy cheeks. She removes the flattering "rats" from her spare tresses. She takes off her eye-lashes and her fingernails. She pulls out her teeth. A twist of the wrist and off come the subclavicular embellishments so that from being magnamammiferous she becomes a-mammiferous. She unzips her foundation garment and permits her curves to resume their natural, unartistic lines. She removes the vein-concealing stockings and the pads which have made her knock-kneed legs look straight. At last the bride stands before her groom in puris naturalibus—and what a puris naturalibus! Alas, poor Romeo! Where now is that happy smile, that sparkle of anticipation in the eye, that tumultuous pounding of the heart? They are gone with the snows of yester year. In their place is bewilderment of mind and anguish of spirit. Juliette sees this and nonchalantly lighting a cigarette, blows the smoke in his face. "Romeo," she says, "you are now old enough to be told the facts of life. The first fact is this—love is blind but marriage is an eye opener." Again, alas poor Romeo! You see his mamma never done told him that woman was a worrisome thing that would make him to sing the blues in the night.

In certain quarters revealing bathing suits are frowned upon. But they offer some sort of protection to the love-lorn although I wouldn't put it past the girls to fake even them. A far better plan was suggested by Sir Thomas More and, as you may be curious to know what it was, I refer you to page 534 where you will find it under the heading "Medico-historical."

Au Revoir and Farewell

Dr. Ken Johnson, who has been in charge of the Tuberculosis section, is in Chicago, where he is perfecting himself as an endoscopist. Dr. R. E. Beamish, who has been chiefly responsible for cardio-vascular affairs, is on his way to London, where, as a Nuffield Scholar, he will be under the tutelage of Professor McMichael. Both of them will in time return; but our third editorial loss is, I am afraid, permanent. Dr. P. C. Lund has accepted an appointment in the United States. I am glad for his sake, but sorry for my own, that he is going. He was the ideal collaborator, always on time, always with a good contribution, always ready to advise. He has done a great deal for anaesthesiology and anaesthesiologists. His activities have been appreciated and admired without as well as within our local boundaries. Not only has he been held in high regard as an anaesthetist but also as a most pleasant and likeable individual. In both capacities he will be missed.

But the brighter the star in our medical sky the surer we can be that it will not shine here for long. I had occasion some time ago to point out that nowhere above or below the International Boundary are anaesthetists so poorly paid as here. The hospitals of Winnipeg make it easy for their anaesthetists to leave the city because they offer little inducement for them to stay. By working elsewhere an anaesthetist can practically double or triple the length of his professional life for elsewhere each can earn here in a single year as much as he could earn in two or three years. The record of the immediate past suggests that Winnipeg is fated to become the training place for the staffs of richer or more liberal institutions, foreign or domestic.

(Continued on page 551)

SOCIAL NEWS

Reported by K. Borthwick-Leslie, M.D.

Congratulations to two of our popular Medical friends, now located in Ottawa. Dr. H. W. Lewis, formerly head of the Indian Health Services in Northern Saskatchewan to Medical Superintendent of Indian Affairs for the eastern Arctic. Dr. Lewis is a past president of the Manitoba Medical Association, and a very popular Lt. Col. in R.C.A.M.C. The second promotion of interest is that of Dr. Percy E. Moore to Director of Canadian Indian Health Services.

♦

Promotions seem to be in order. We are pleased to note that B. H. Olson, B.A., M.D., has been appointed Medical Director of the Great-West Life Assurance Company, succeeding the late Dr. W. L. Mann.

♦

Also Dr. L. P. Gendreau, senior psychiatrist and assistant physician of Selkirk Mental Hospital, has been named Deputy Commissioner, in charge of Administration of Medical Facilities for all Canadian penitentiaries.

♦

Also Dr. Lynn Gunn, who has so ably acted as Superintendent of Deer Lodge Hospital, has been posted to become Superintendent of Shaughnessy Hospital, Vancouver, B.C. He will be replaced here by Dr. W. R. Dunlop of the Col. Belcher Hospital, Calgary.

♦

Good luck to all these men in their new postings.

♦

The marriage of Phyllis Shannon to Dr. Victor J. H. Sharpe took place July 5th in Barrie, Ontario. Dr. and Mrs. Sharpe will reside in Brandon where Dr. Sharpe is associated with the Bigelow Clinic.

♦

On August 16th, in Augustine Church, Sheila Eileen Tate (ex. N/S) became the bride of Dr. John A. W. Alcock, son of Mr. and Mrs. A. W. Alcock. Dr. and Mrs. Alcock will leave the end of the month for London, England, where Johnny will do post graduate work. They will be accompanied by Dr. and Mrs. E. J. Thomas, who post graduate in Hammersmith, England.

♦

Dr. and Mrs. H. O. McDiarmid of Brandon, Manitoba, announce the engagement of their daughter Leila Kathleen to Ronald H. Leek of Vancouver, B.C. The wedding will take place September 13th, in Brandon.

♦

Mr. and Mrs. W. S. Peters of Wawanesa, Manitoba, parents of Dr. Wilfred Peters, Brandon, celebrated their Golden Wedding Anniversary August 23rd. in Wawanesa. Sincere good wishes to Mr. and Mrs. Peters.

Dr. and Mrs. Leon A. Pauls and family, Borebank Street, left last week for New York, where Dr. Pauls will do post graduate work at the Polyclinic Hospital.

♦

The marriage of Eileen Munro, Swan River, to Dr. Clifford Cormie of Culross, Manitoba, took place August 14th. Dr. and Mrs. Cormie will reside at Beechy, Sask.

♦

Dr. and Mrs. Campbell McIntyre and son, Selkirk, Manitoba, are on an extended motor holiday in the States and Eastern Canada. Dr. McIntyre is a delegate at the National Convention of the Federation of Home and School Association in Sackville, New Brunswick.

♦

Dr. and Mrs. J. W. Macleod and family, are motoring via Banff and Lake Louise back to their home in Pasadena, California, after spending their vacation with Mr. and Mrs. Macleod, Victoria Beach.

♦

Dr. and Mrs. Cecil Strachan, London, Ontario, were guests in Winnipeg, attending the Lock-Lothian wedding.

♦

More and more well deserved recognition of the ability of our Medical Men. Dr. R. E. Beamish has been awarded the Nuffield Fellowship in Internal Medicine at the Post Graduate School of Medicine, Hammersmith, London, England. Dr. and Mrs. Beamish leave August 27th for England via New York.

♦

Congratulations too, to Dr. C. B. Schoemperlen, on becoming a Fellow of the American College of Chest Physicians. He recently attended the Convocation Exercises of the College.

♦

Tuesday evening the 25th, was a mixture of sadness and pleasure for the Manitoba Branch of Anaesthesiologists. The group gathered to say farewell to two popular members, Drs. Rumball and Lund, who leave this month for further glory. We were guests of Dr. Marjorie Bennett and Donalda Huggins for cocktails prior to dinner at the Fort Garry Hotel, returning to the home of Dr. Huggins for the evening.

♦

Dr. Rumball goes to Regina, Saskatchewan, associated with Dr. Leech at the Regina General Hospital.

♦

Dr. Lund, to Johnston, Pennsylvania, as Director of Anaesthesiology, in the Comenaugh Valley Memorial Hospital. The boys will be sadly missed in Winnipeg.

ASSOCIATION PAGE

Reported by M. T. Macfarland, M.D.

Election of Officers

The following officers were elected for the year 1947-48:

President: Dr. R. W. Richardson.
1st Vice-President: Dr. H. S. Evans.
2nd Vice-President: Dr. D. L. Scott.
Hon. Secretary: Dr. A. M. Goodwin.
Hon. Treasurer: Dr. H. M. Edmison.
Member-at-Large: Dr. F. G. Allison,
Dr. G. H. Hamlin.

Prepayment of Medical Care

It is reported that the Council of Medical Services of the American Medical Association has been the successful arbitrator between two medical prepaid service plans in Wisconsin. As a result, there will be a single state-wide plan combining both existing plans. Operation will be on a non-profit basis and control in accordance with the physician population in Wisconsin. In Canada planning continues.

At the last meeting of the Ontario Division steps were taken to inaugurate a new province-wide plan for prepaid medical care. Operation of the plan is to be outside the Association but the governing body of the plan will comprise a majority of medical men. Co-operation of the existing plans is anticipated.

A province-wide plan of voluntary health insurance will be proposed at the Annual Meeting of the Alberta Division which meets in Edmonton from September 10th to 12th.

Two plans are already in operation in Saskatchewan and report of their progress will, doubtless, be given at the meeting of the Saskatchewan Division, September 8th to 10th.

It was recently reported in the Nova Scotia Medical Bulletin that each Maritime Division will make a study of prepayment plans already in existence in Canada and the United States. Following the study "representatives from the three Societies should meet to discuss the feasibility of starting a prepayment plan for the Maritimes under the joint control of the three Medical Societies."

Adjourned Annual Meeting — Watch for Date!

Well, the holiday season is practically over for another year and when everyone gets rested after their vacation the fall activities will proceed apace. Not all the activities of the Association have been held in abeyance because of hot weather or vacations (the thermometer registers 95 degrees while this is being written). Various committees have been active, especially those concerned with the problem of Admission to Medical College, and the Negotiating Committee for the Revision of Schedule of Fees payable under the Workmen's Compensation Board.

A printed copy of the Annual Reports was enclosed in the August issue of the Review, addressed to each member of the profession in Manitoba. These reports merit your perusal since they contain many matters of concern to every member of the Association.

While considerable business of a routine nature was dealt with at the meeting on June 24th, the time was wholly inadequate for the consideration of many important items.

A preliminary report of the Conference on Prepaid Medical Care, which was held under the auspices of the Canadian Medical Association from June 17th to 20th, was given by Dr. E. S. Moorhead, Medical Director of the Manitoba Medical Service, but a fuller opportunity for discussion by all medical members participating in the Manitoba scheme will be given at the adjourned Annual Meeting. Various other matters of medical economics and closer co-operation with the College of Physicians and Surgeons of Manitoba will be discussed.

The date of the meeting will be late September or early October—Watch for the date!

District Society Meetings

A communication was sent on July 29th, 1947, to each District Medical Society asking for suggested place and date for the next meeting of the local society. Suggestions concerning speakers were invited and requests of this nature are passed to the Chairman of the Extra-Mural Committee, since he is the one who recommends dispersal of the funds which are provided for the purpose by the College of Physicians and Surgeons. Movie films are available at small cost from a number of sources and are a valuable medium of instructional material. Of great benefit is the get-together which brings doctors of the district and their wives to meet their confreres and exchange experiences, to swap stories and to enjoy a social time.

Professional Registry

Requests continue to reach the Association office for information concerning available opportunities for practice in Manitoba, and from various Federal, Provincial and Municipal authorities seeking doctors for appointments. In each case an effort has been made to bring the "Seekers" and the "Sought" together.

During the past six weeks applications have been received from graduates of British Schools, each of whom has seen service with the Forces. Internes who have completed training in the

various Winnipeg hospitals are seeking locations, one wishes a locum tenens for a couple of months before he accepts another appointment for more advanced study, while another wishes to become definitely established. The Department of Veterans Affairs is looking for three graduate internes for the Departments of Urology, Neurosurgery and Internal Medicine at Deer Lodge Hospital. The Civil Service of Canada have announced competition for medical officers for the Indian Health Services, and various other specialist appointments. The Department of National Defence requires medical officers for the peacetime R.C.A.M.C.—"Responsibility Pay" and extensions of the age limit have been added inducements. The Department of Health and Public Welfare of Manitoba has issued a preliminary, sketchy outline of Municipalities requiring the service of a doctor, and various locations where a medical man might render humanitarian service while making a good livelihood. At least one Manitoba Municipality has advertised recently for a doctor to replace the present incumbent, while the local press contains frequent advertisements in the "Help Wanted" columns for doctors for other provinces. More information and co-ordination will be required.

Members are again requested to send any relevant data to the Association office.

Preliminary Notices

Brandon and District Medical Association—Meeting Wednesday, September 10th, at the Prince Edward Hotel, Brandon.

South District Medical Society—Meeting Thursday, September 11th, at 2 p.m., at Altona.

Northwestern District Medical Society—Meeting September ?? (date to be announced later), at Russell.

Book Review

Improvised Equipment in The Home Care of the Sick. Lyla M. Olson, R.N., Superintendent of Nurses, Kahler Hospital, Rochester, Minnesota.

This attractive and informative volume would be a splendid adjunct to the First Aid and Home Nursing Manuals with which we are familiar in the St. John Ambulance and Red Cross teaching programmes.

The author, a graduate nurse of high standing, has given us in this handy little book, a wealth of well chosen, practical ideas to be used not only in the country and isolated districts, but also in the average city home today when hospitals are over crowded, nursing services taxed to the limit, and members of the family must of necessity assume the care of the sick.

The text is divided into twelve chapters and a noteworthy feature of the volume is its remarkably clear illustrations.

The care of babies and young children is given much attention, ideas being culled from various publications all tried and found worth while. To mention a few—the dresser drawer or clothes basket as improvised beds, the kitchen table inverted with wire netting to make a pen for play and fresh air, and barrel hoop with spring type of clothes pins as a clothes rack—particularly useful in cramped quarters.

In the second chapter, Home Delivery is well handled. The set up of the home delivery room reminds one of the very efficient arrangement the Victorian Order of Nurses achieve with newspapers, kitchen bowls and old linen.

Another chapter on equipment in Bedside Nursing Care presents good ideas on ventilation and making a simple humidifier, also means to lessen noise by attaching rubber strips to the door and a small block of wood with a tapered end for insertion between the sash and casing to prevent windows rattling. There are so many suggestions of equipment for bedside care that it would be difficult to encounter any case for which some aid has not been devised. This chapter alone entitles this book to a place in every home as well as a handy reference book for doctors and nurses.

Surgery presents many difficulties in the home and in unorganized districts. Sterilizing dressings and instruments for an emergency operation is adequately discussed by the author, utilizing the common things in an ordinary home.

Illustrations of bandages and splints for First Aid are very clear and directions easy to follow.

Common things in the home such as chairs, tables, newspapers, cellophane, rubber and clothes pins, all share in the improvising.

Substitutes for can openers, apple corers, beef press, stoves and magnifying glass are all given space.

Ingenious methods are recommended for shower baths, sitz baths and tub baths.

Fireless cooker, iceless refrigerator, and improvised ice box are given attention.

Transportation of the sick and wounded is thoroughly dealt with and methods suggested employing everything from a rope stretcher to a four-handed seat carry or human stretcher.

A synopsis of the book in rhyme is very cleverly given in the last chapter and should appeal particularly to St. John Ambulance Cadets, the Girl Guides, and even older people who find memorizing through rhyming quite easy.

Wide circulation of this book is highly recommended.

M. Ellen Douglass

Department of Health and Public Welfare

Comparisons Communicable Diseases — Manitoba (Whites and Indians)

DISEASES	1947		1946		TOTALS	
	June 15 to July 12,'47	May 18 to June 14,'47	June 16 to July 13,'46	May 19 to June 15, 46	Dec. 30,'46 to July 12,'47	Dec. 30, 45 to July 13,'46
Anterior Poliomyelitis	2	0	1	0	2	2
Chickenpox	174	140	146	127	755	802
Diphtheria	3	10	11	16	57	111
Diphtheria Carriers	2	4	2	1	16	11
Dysentery—Amoebic	0	0	0	0	0	1
Dysentery—Bacillary	1	0	0	0	2	1
Erysipelas	4	1	3	4	26	46
Encephalitis	0	1	1	0	2	1
Influenza	3	26	5	5	85	163
Measles	315	571	613	420	6251	1347
Measles—German	0	4	4	0	32	16
Meningococcal Meningitis	1	0	2	0	8	9
Mumps	42	80	136	305	1124	1752
Ophthalmia Neonatorum	0	0	0	0	0	0
Pneumonia—Lobar	16	30	7	23	132	116
Puerperal Fever	0	1	0	0	2	1
Scarlet Fever	12	16	56	68	132	397
Septic Sore Throat	3	2	3	0	13	23
Smallpox	0	0	0	0	0	0
Tetanus	0	0	0	1	1	1
Trachoma	0	0	0	1	2	1
Tuberculosis	110	78	55	105	496	496
Typhoid Fever	2	1	1	2	3	11
Typhoid Paratyphoid	0	0	1	0	0	2
Typhoid Carriers	0	0	0	0	1	2
Undulant Fever	1	1	2	5	5	15
Whooping Cough	42	144	24	19	656	190
Gonorrhoea	151	178	199	152	979	1314
Syphilis	55	53	48	57	330	378
Diarrhoea and Enteritis, under 1 yr.	14	27	37	28	82	107

Four-Week Period Report, June 15th to July 12th, 1947

DISEASES (White Cases Only)	*718,699 Manitoba	*906,000 Saskatchewan	*3,825,000 Ontario	*2,962,000 Minnesota
*Approximate population.				
Anterior Poliomyelitis	2	1	5	11
Chickenpox	174	182	890	....
Diarrhoea & Enteritis (under 1 yr.)	14	5	....	....
Diphtheria	3	4	12	17
Diphtheria Carriers	2	....	....	5
Dysentery—Amoebic	....	....	2	4
Dysentery—Bacillary	1	....	1	1
Erysipelas	4	1	2	....
Infectious Jaundice	....	....	5	....
Influenza	3	13	16	....
Malaria	....	....	....	35
Measles	315	121	712	926
Measles—German	....	54	83	....
Meningococcal Meningitis	1	4	5	2
Mumps	42	83	974	....
Pneumonia Lobar	16	....	....	....
Scarlet Fever	12	16	194	51
Septic Sore Throat	3	2	....	....
Tuberculosis	110	30	128	176
Tularemia	....	....	....	2
Typhoid Fever	2	....	5	2
Typh. Para-Typhoid	....	....	1	....
Undulant Fever	1	2	9	35
Whooping Cough	42	7	275	173
Gonorrhoea	151	....	305	....
Syphilis	55	....	221	....

DEATHS FROM COMMUNICABLE DISEASES

For Four-Week Period June 17th to July 15th, 1947

Urban — Cancer, 45; Influenza, 1; Measles, 1; Pneumonia (other forms), 10; Syphilis, 3; Tuberculosis, 3; Whooping Cough, 1; Diarrhoea and Enteritis (under 2 years), 7; Hodgkins Disease, 1; Dysentery, 1. Other deaths under 1 year, 21. Other deaths over 1 year, 171. Stillbirths, 14. Total, 206.

Rural—Cancer, 30; Influenza, 2; Pneumonia Lobar (108, 107, 109), 2; Pneumonia (other forms), 10; Tuberculosis, 21; Diarrhoea and Enteritis (under 2 years), 4; Disease of Skin, 1; Hodgkins Disease, 2. Other deaths under 1 year, 20. Other deaths over 1 year, 142. Stillbirths, 9. Total, 171.

Indians—Influenza, 18; Lethargic Encephalitis, 1; Measles, 1; Pneumonia (other forms), 5; Tuberculosis, 4; Septicemia, 1; Diarrhoea and Enteritis (under 2 years), 1. Other deaths under 1 year, 9. Other deaths over 1 year, 7. Stillbirths, 1. Total, 17.

♦

The disease of particular interest at the moment is Poliomyelitis. The number of cases reported for the period referred to above does not reflect the situation which will exist by the time you receive this Journal. On August 13th, the date on which this report is submitted, there have been reported 146 cases of poliomyelitis in Manitoba. The disease on the whole has been relatively mild. The matter of diagnosis between poliomyelitis and epidemic encephalitis has been troublesome at times.

Announcement Re New Strength of Some Biologics and Insulin

Department of Health and Public Welfare, Province of Manitoba

Connaught Laboratories have just announced that they have now made available **pertussis vaccine** and also diphtheria toxoid **combined** with pertussis vaccine in a new, smaller size dose. These products are given in **four x one c.c. doses.** The first three doses are given three or four weeks apart and the fourth dose, which is a recall dose, is given **three months** after the third dose.

It has been realized that the old two c.c. dose caused some difficulty in administration whether given as a single dose in one arm or as two doses of one c.c. each in both arms. This has been overcome with the new product by concentrating the antigen so that the four one c.c. doses supply at least an equal amount of protection. These new materials come in **one person** and **nine person** sizes and are available to physicians in Manitoba, free of cost, from the Department of Health and Public Welfare.

The old two c.c. size dose is still available if you prefer it. In your orders please specify which type you desire.

Insulin Connaughts have also informed us that the 40 unit per c.c. **zinc crystals insulin** will be gradually withdrawn from the market. They state: "This is being done in the light of experience in the United States and in other countries, and in an endeavour to meet rising costs with measures of increased economy."

The 40 units per c.c. and 80 units per c.c. strengths of this type insulin of course are still readily available so in prescribing insulin for your patients in future it should be kept in mind to prescribe either one of these two strengths. Excepting where the number of units prescribed is very small the greater strengths of insulin will be of definite advantage to your patients in reducing the size of their doses.

F. W. Jackson, M.D.
Deputy Minister, Dept. of Health and Public Welfare.

Army Medical Library Microfilm Service

During the war, the Army Medical Library, through its photoduplication services, supplied millions of pages of microfilmed medical articles to the armed services and other research agencies. The principal of immediate aid direct to the user, wherever he might be introduced a new technique to assist medical research.

This service is now generally available for civilian physicians, institutions and research workers on a cost basis. This means direct access to the library's enormous resources of medical literature.

A fee of fifty cents is charged for filming any periodical article in a single volume, regardless of length. Microfilming from monographs is furnished at fifty cents for fifty pages or fraction thereof. Photostats are also available at a charge of fifty cents per ten pages or fraction thereof. Material filmed is not for reproduction without permission of the copyright owner.

For convenience and to keep bookkeeping costs down, a coupon system has been established. Users may buy any quantity of photoduplication coupons at fifty cents each. Order blanks are available upon request. Checks should be made payable to the treasurer of the United States. and sent to the Army Medical Library, 7th St. and Independence Ave. S.W., Washington 25, D.C.

Au Revoir and Farewell

(Continued from page 538)

Meanwhile good luck to Dr. Lund. He won't forget us I am sure. After all he has two children, little Miss Lund whose auspicious arrival was hailed by the booming of guns, and the section on Anaesthesiology which each month inflicted upon him those gestationary discomforts and parturient pains that so strongly tie parent to child. Because of that he will guide the section's foster-parent and keep himself fresh in our memories.